CONTEXT

Ecological ■ Cultural

CONTEXT

> LANDSCAPES, LIKE PEOPLE, RARELY stand alone. Every landscape is joined with all other landscapes in a network of interdependence that extends over the entire earth. Everything, as the saying goes, is indeed related, at some level, to everything else. So when we shape a landscape of any size, we need to place it in a larger perspective, to see the web of relationships and avoid breaking critical strands, and sometimes perhaps to create new ones (Lyle 1999, 24).

This section will describe the landscape character of the westside of Long Beach. Landscape character is defined as those "particular attributes, qualities and traits of a landscape that give it an image and make it identifiable or unique" (USDA, 1997, Glossary-3). The landscape character of Long Beach will include the ecological and cultural settings of the city.

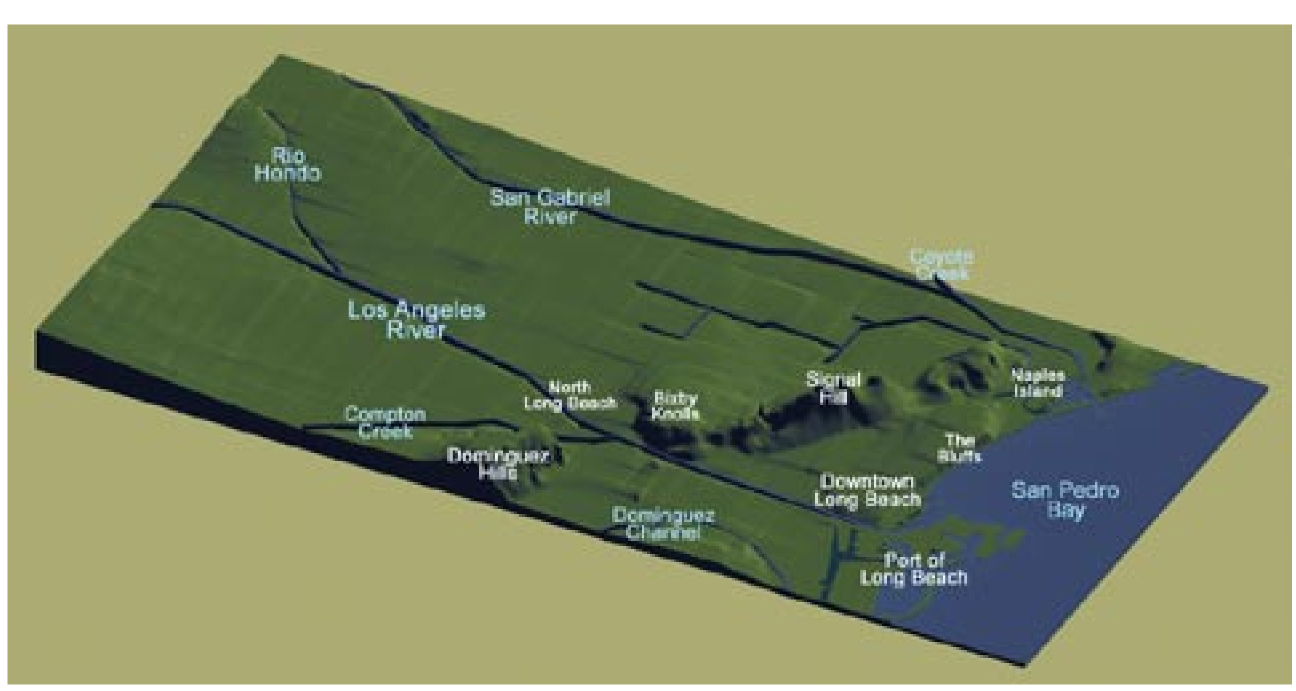
ECOLOGICAL SETTING

Physiography

Long Beach is situated on a slightly elevated terrace amidst the coastal plain of the Los Angeles basin, which was formed by the rivers of the region depositing sand and gravel on their way to the ocean. The coastal plain is generally flat with geologic uplifts breaking the surface across the plain. These are the hills and mounds that make up the Southern California landscape. The Inglewood-Newport fault system stretches in a northwest-southeast direction defining the hills and geologic features local to Long Beach. The terrace on which Long Beach sits creates the eastern ridge of a valley in which the Los Angles River flows. The ridge is at some locations very subtle, in other places dramatic, creating vast overlooks into the valley below. Most notable to Long Beach is the City of Signal Hill, which rises to a height of 360 feet. "Water Tank Hill" to the east of Signal Hill rises to a similar height and the Palos Verdes Hills, located west of Long Beach, rise to 1480 feet above sea level (City of Long Beach, 1973).

As the region's rivers became silted in with sand and gravel, they sunk down into the earth and became subsurface aquifers. Three major aquifers lie beneath Long Beach; the 400-foot Gravel, the 200-foot Sand and the Gaspur Zone, which typically contain brine water that improves to potable status further inland. The map on page 15 shows the approximate depth to groundwater in the westside of Long Beach. The shallow depths of groundwater along the river preclude the use of recharge basins near the river's mouth. Together these three aquifers can store approximately thirty million acre-feet of water, which until the 1920s was fresh water. Industrial pollution and salt-water intrusion contaminated these subsurface reservoirs. Brine wastes from oil dumping in the harbor area created further pollution problems. Brine wastes are deficient of oxygen, and when mixed in with the harbor water; they created situations in which the marine life could not survive. Fortunately this practice of dumping was ceased in 1972, in accordance with the California Regional Water Quality Control Board (City of Long Beach, 1973).

As a result of oil extraction, subsidence has created environmental problems for Long Beach. When oil was extracted form subterranean reservoirs, the pressure dropped and the surface sank in to fill the gap. This created a bowl-shaped depression in the harbor, which severed oil wells and damaged buildings, bridges, and infrastructure. Since 1958, the subsidence zones have been injected with water to offset the sinking (City of Long Beach, 1973).

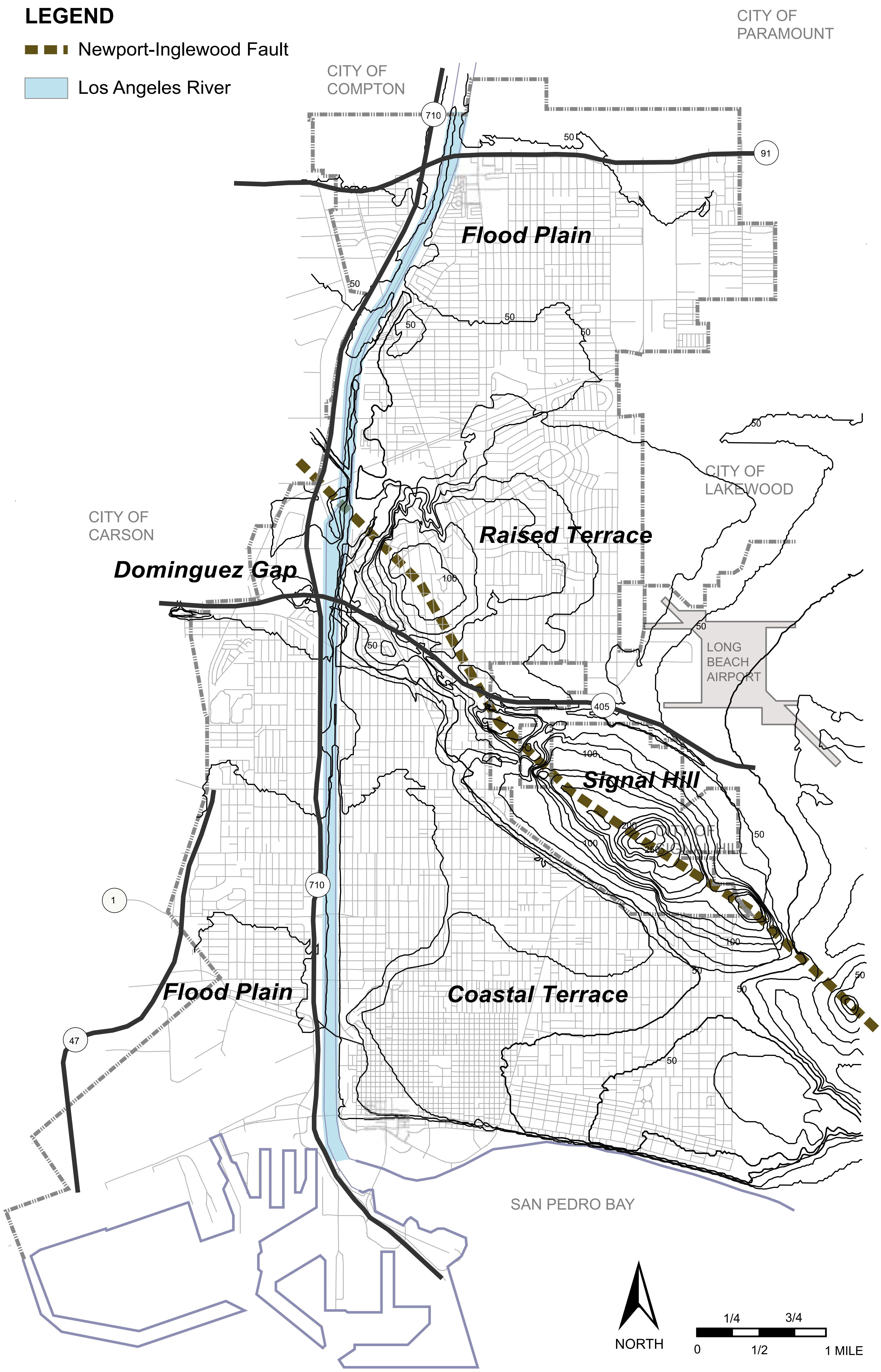


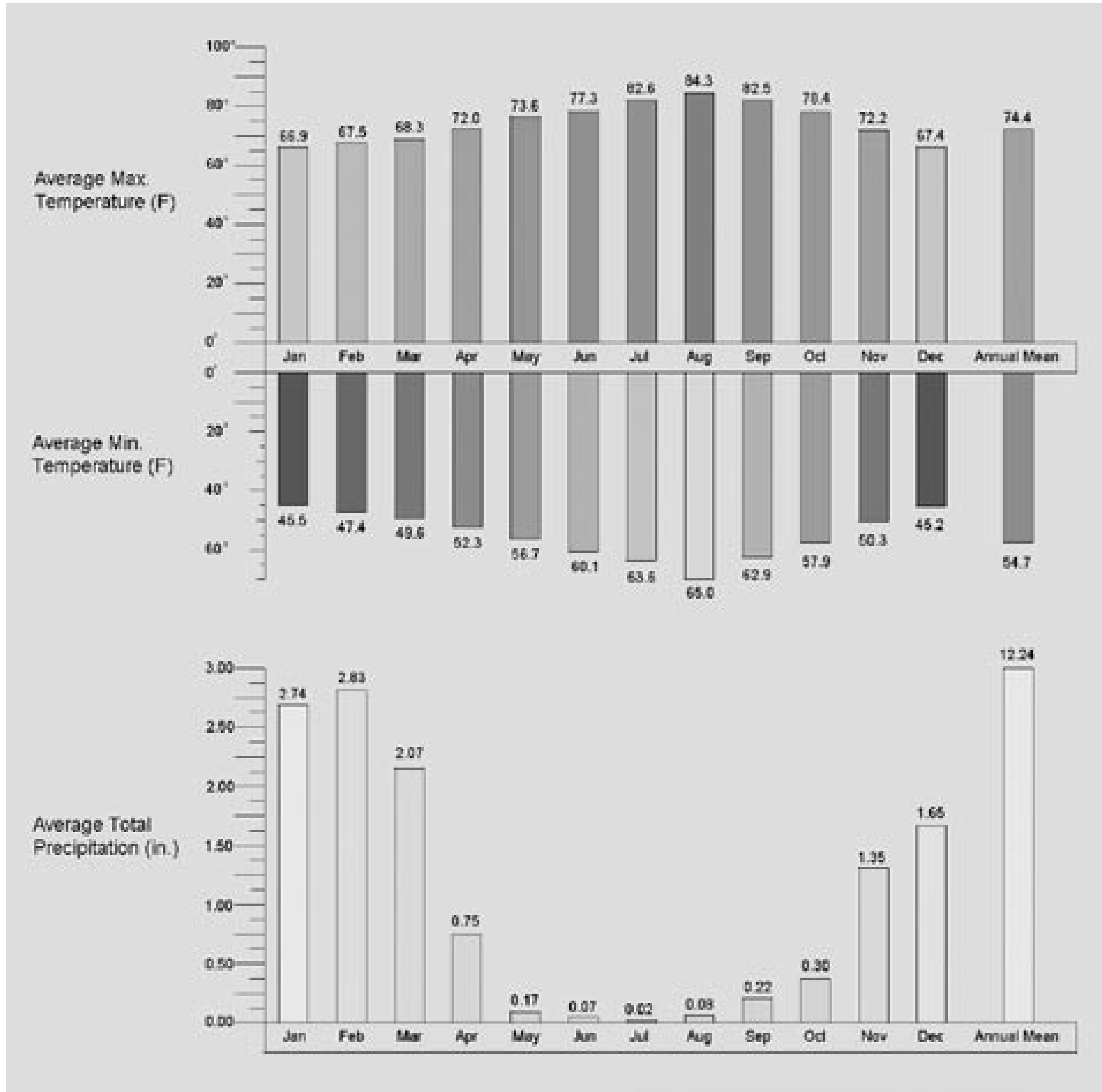
Digital Physiographic Model of Long Beach and Vicinity

WESTSIDE OF LONG BEACH

PHYSIOGRAPHY

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA





Climate Data from the Long Beach WSCMO Station: Period of Record 4/1/1958 - 12/31/2000

Climate

The climate of Southern California is classified as Mediterranean, which is characterized by hot summer droughts followed by winter rains. This rare climate is only found surrounding the Mediterranean Sea, in South Africa, southern Australia, and coastal southern California.

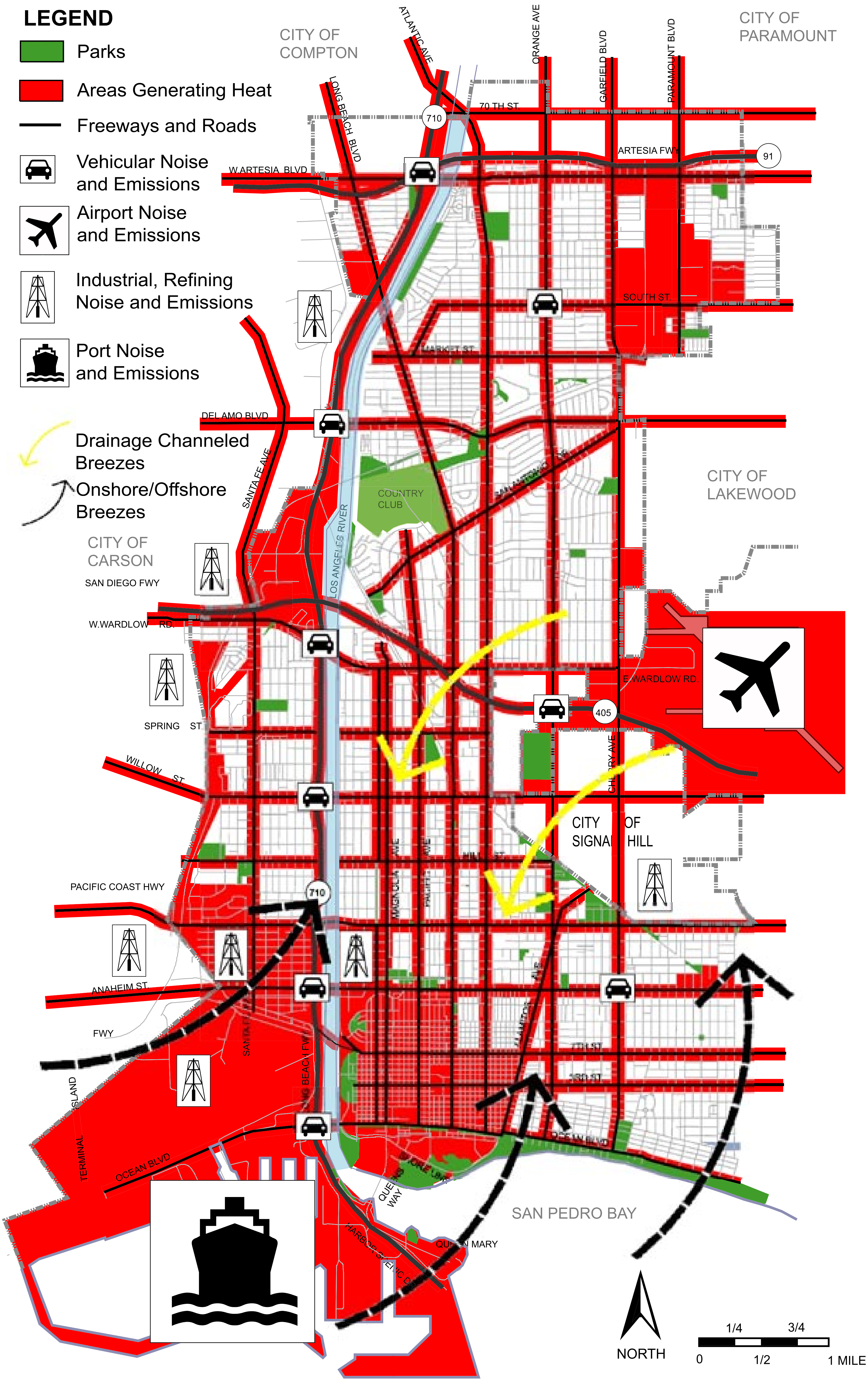
Along the coastal plain, the high-pressure belts of the subtropics shift northwards in the summer creating average highs of 81.4 degrees Fahrenheit and lows of 62.9 degrees. In the mild winter months, when the high-pressure belt retreats towards the equator, the average highs are 67.3 degrees Fahrenheit with lows of 46.0 degrees. The winter rains are variable but typically bring about 12 inches. Rainfall in the mountains surrounding the coastal plain accounts for 75% of the runoff for the entire region. The mountains also trap ocean breezes, keeping the summer temperatures moderate, as well as trap winter storms, creating the sometimes catastrophic flood events.

Urban heat islands effect large portions of the westside of Long Beach, contributing to higher microclimate temperatures in and around industrial zones or other areas with large paved surfaces and sparse tree canopy. The map to the right shows downtown Long Beach and much of Willmore City engulfed by the heat island effect generated largely from the ports, light industrial zones, and lack of street trees. The map also denotes other pollution sources affecting air quality in the westside of Long Beach. For more information on the urban heat island effect, see Appendix C.

WESTSIDE OF LONG BEACH

AIR QUALITY AND THE HEAT ISLAND EFFECT

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



Hydrology

The Los Angeles River has always played a major role in the development of the Los Angeles basin, however its ecological relationship with the city has changed. The unpredictable floodwaters have jumped the channel and caused severe disturbances. In 1815, excessive storms forced the river out of its natural path, where it turned 90 degrees towards present-day Santa Monica, flooding the present day Ballona Creek until 1825, when the river course reverted to its more typical flow. In Long Beach, the city coexisted with the river until booming development spurred the need to control the flooding. As development pushed to the channel's edge and property values rose, the natural state of the river declined.

> The course of the Los Angeles River was most ambiguous just above its mouth. South of Compton, the bed of the river was coincident with the water table, so even though its flow here was enlarged by the Rio Hondo, it was unable to dig a distinct channel. As a result, floodwaters carried by the river often spread fan-shaped over the flatlands between San Pedro and Long Beach. Lagoons and marshes swelled by the river's overflow once extended from the Palos Verdes Hills all the way to the highlands of Long Beach (Gumprecht, 1999, p.143).

The flood control system put in place by the Army Corps of Engineers has served its purpose by protecting Long Beach from major flood events, such as that of January and February 1969, when a flow of over 55,000 cubic feet per second was recorded at the Wardlow Road monitoring station. Despite the channelization of the river, a significant portion of Long Beach remains in direct threat of flooding. The flood channel will hold up to a 100-year flood event, however a greater event would inundate a majority of the southwest portions of Long Beach, including much of the study area of the RiverLink project.

The Los Angeles River watershed is approximately 825 square miles, one of the largest watersheds in the Region. The headwaters begin in the San Gabriel Mountains above the San Fernando Valley and drop a total of 7,000 feet on the journey to San Pedro Bay. Approximately 324 square miles (39%) of the watershed are covered by forest or open space land and the rest of the watershed is highly developed.

The water quality of the Los Angeles River has become impaired by the urbanization of the Los Angeles basin. The majority of impairments are due to both point-source and nonpoint-source pollution. Impairments listed by Los Angeles County include: pH, ammonia, various metals, bacteria, trash, scum, algae, oil, pesticides, and volatile organics. Until efforts in the upper watershed demonstrate significant reductions in water pollution, the reach of the river through Long Beach will continue to be impaired.

Storm water runoff is delivered to the channel through a system of lateral and trunk lines to pump stations along the banks. Flows of the river vary dramatically throughout the year. Storm flows measured south of Wardlow Road in Long Beach over a 10-year period ranged from a low of 33 cubic feet per second (cfs) to a maximum flow of 545 cfs. The city of Long Beach maintains a storm drain system also consisting of a network of lateral and trunk lines that drain a number of drainage basins. The trunk lines collect at one of fifteen pump stations along the river that discharge directly into the channel.

The Los Angles County Department of Public Works (LACDPW) along with the U.S. Army Corps of Engineers (USACE) have set constraints as to what can physically be done to the river channel. Public safety is their primary concern, and supercedes recreational opportunities and aesthetic improvements to the channel. Floodwaters have claimed many lives over the years and the RiverLink project must provide for public safety. The LACDPW/USACE state that:

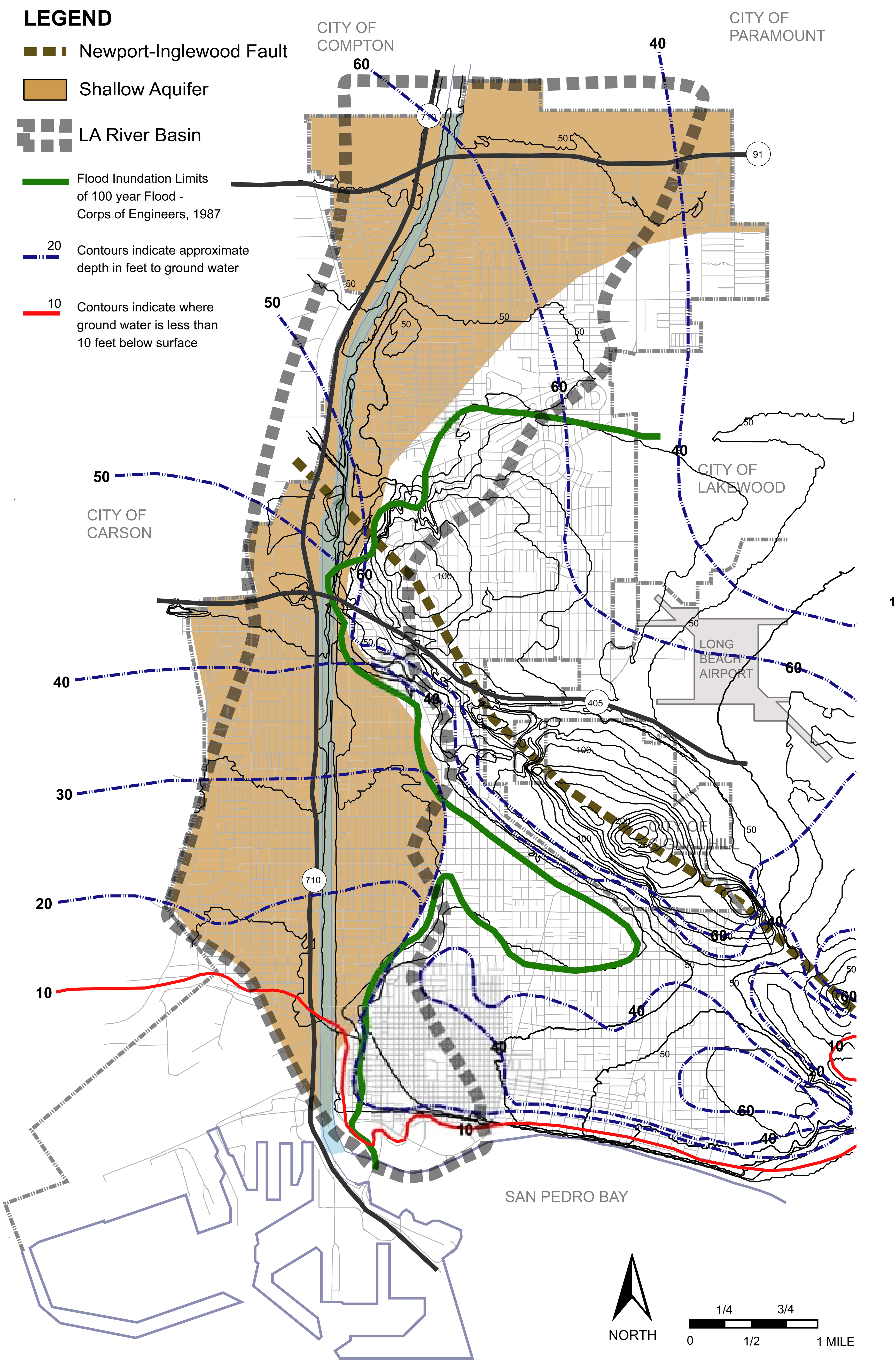
- There will be no adverse impact to storm water conveyance in the channel. This includes material changes along the channel surface, structural alterations to the channel walls, and excessive vegetation within the channel. The USACE will consider allowing the city to pierce a hole in the channel as long as the structural integrity of the wall is maintained. This could allow for river water to be brought into adjacent sites as wetlands or water features.

- It is a consideration to cease aggregate mining in the river. Mining would only be allowed when sand bars exceed 25% of the channel's conveyance. This restriction on mining could allow sand bars to accumulate and create habitat value for coastal and migratory birds; this model was accomplished successfully along the lower 23 miles of the Santa Ana River.

- Tree plantings are a consideration in the bottom one-third of the channel walls. Typically vegetation is not allowed in storm water channels because it affects the conveyance and traps sediments; however the USACE has not made a final decision about allowing vegetation within this defined area. Such an action will further increase the aesthetic and wildlife value of the river.

WESTSIDE OF LONG BEACH
HYDROLOGIC FEATURES

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



The river has a concrete-lined bed from the northern limits of the city and becomes soft bottom at Willow Street. The soft bottom of the Los Angeles River is a result of a high water table limiting the use of concrete in the most southern portion of the river. The high water table limits recharge opportunities and retention strategies. The ground water levels along the RiverLink study area range from below 10 feet at the mouth of the Los Angeles River to approximately 40 feet at Wardlow Road.

The high water table is evident along the levee banks in the form of seeps and seasonal wetland areas. Wetland areas along the Long Beach reach of the Los Angeles River include Dominguez Gap, Willow Street, and the mouth of the Los Angeles River. A wetland project is also under consideration by the City of Long Beach south of the current DeForest Park.

The Dominguez Gap is currently used as a retention basin for storm water. The Los Angeles County Department of Public Works is in the process of developing the basin into a fully functional wetland area. The proposal is expected to utilize a 21-inch existing conduit to siphon low flow water from the river channel. This study is still ongoing.

Beginning at the soft bottom portion of the Los Angeles River and extending into the tidal influence area, the Los Angeles Regional Water Quality Control Board designated this stretch of the river as an estuary, in recognition of its ecological importance. This area serves as a major stopping point for birds along the Pacific Flyway.

The mouth of the Los Angeles River once supported one of the largest combinations of salt marsh, mudflats, and sandbars along the southern coast of California. Today however, a seven-acre constructed tidal wetland is all that remains. The Golden Shore Wetlands is noted as a successful and ongoing restoration of historical habitats hosting a rich diversity of avifauna (birds).

Habitat and Vegetation

Riparian woodlands, which historically sprawled across the floodplain, developed stands of nearly impassable undergrowth. This shrubby growth typically included elderberry, wild grape, and other vines. Western sycamore *(Platanus racemosa)* grew as open woodlands in higher alluvial terraces, but did not occur to any great extent on the lower floodplain. White alders *(Alnus rhombifolia)* were typically found in riparian woodlands in the more northern reaches of the river, although, like the sycamore, they were not known to prevail in the coastal areas. As floodwaters would spread out across the alluvium, marshlands and small ponds were created supporting a vast array of plant life such as cattails and bulrush (Gumprecht, 1999).

As the river neared its outlet to the sea, there were extensive areas of salt and brackish marsh. Open lagoons, salt marsh, and mudflats were continuous from the river's mouth just south of San Pedro to the mouth of the San Gabriel River. Scattered willow forests occupied higher areas of the coastal plain, emergent marsh in wet areas, and open native bunch grass or scrub in drier areas (CH2M Hill, 2002).

Scrub and grassland habitats occurred in extensive dunes along coastal beaches. On dry slopes surrounding the coastal plain, coastal sage scrub was predominant, and willow forests represented riparian areas with perennial flow. Drier riparian sites were represented by sycamore, oak, and walnut woodlands. Where flooding was less frequent, sycamore and oak woodlands were more common. (CH2M Hill, 2002).

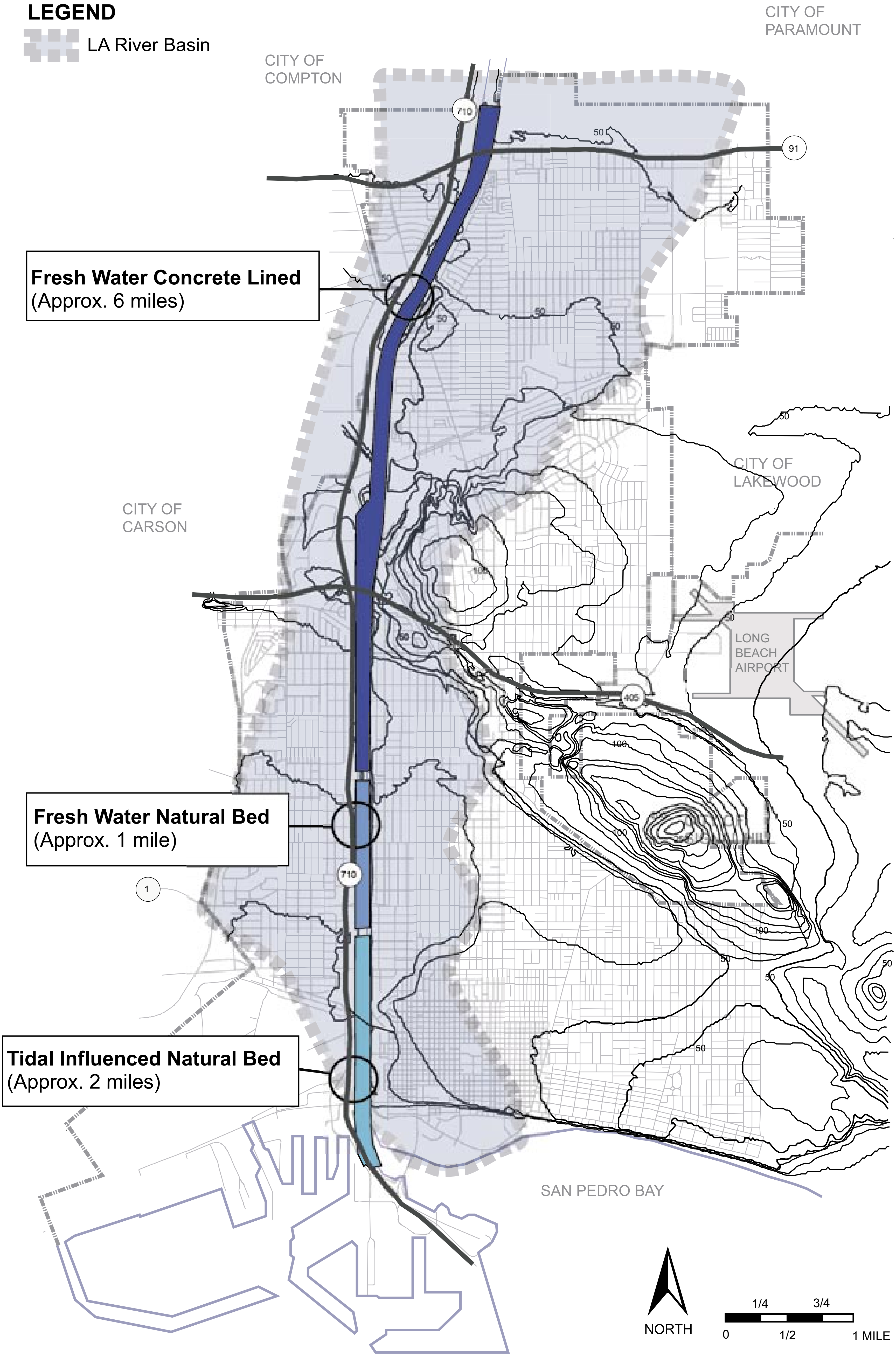
View of Golden Shore Wetlands
(Source: County of Los Angeles Dept. of Public Works, 2003)

Los Angeles River at Willow Street
(Source: County of Los Angeles Dept. of Public Works, 2003)

WESTSIDE OF LONG BEACH

LOS ANGELES RIVER ECOLOGICAL GRADIENTS

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



Urban Nature

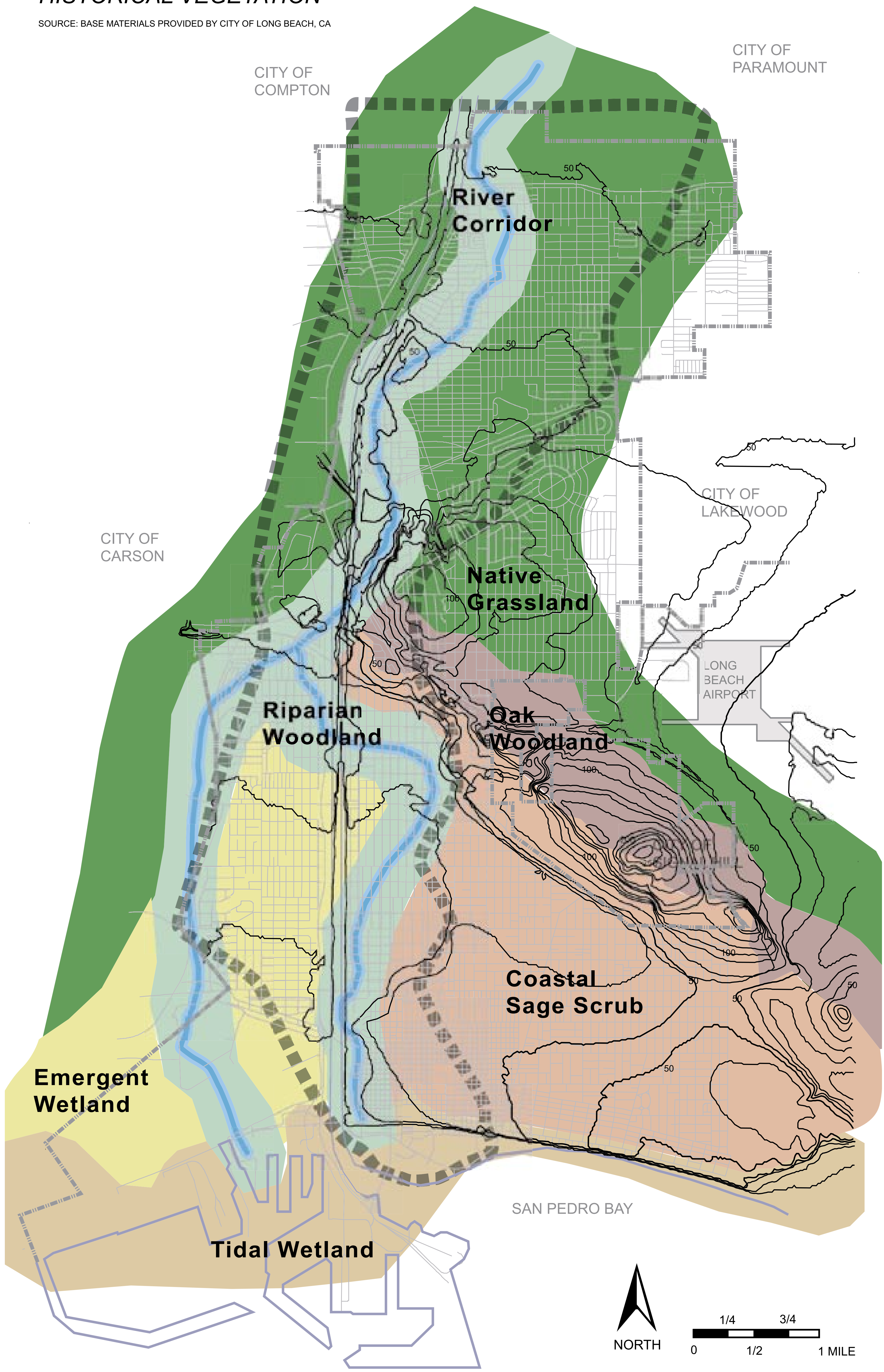
Long Beach is a fully developed city of nearly one-half million residents living in an area of approximately 50 square miles. Wildlife habitats and natural resources have been severely degraded due to urbanization, housing development, highway construction, river channelization, and industrial operations. The Long Beach reach of the Los Angeles River has been extensively altered by channelization, leaving virtually no native habitats intact. The river enters Long Beach from the north as a fresh water and concrete-lined river and empties into San Pedro Bay as a tidally influenced saltwater, soft bottom environment. The river flows past developed, constructed, and naturalized open spaces. A remarkable diversity of avifauna utilizes this urban nature habitat despite its degraded condition, as recorded by the 2002 Friends of the LA River *RiverWatch Biological Monitoring Program: Avifauna Along Portions of the Los Angeles River.* A total of 78 different bird species were recorded between DeForest Park and the Golden Shore Wetlands, including the federally threatened western snowy plover *(Charadrius alexandrinus nivosus).*

The open spaces adjacent to the river consist of: (A) ruderal, invasive species; (B) disturbed and compacted soils not supporting extensive vegetation; (C) ornamental or landscaped areas; (D) native riparian woodland or emergent wetland in small patches; and (C) developed roadways, levees, and structures (CH2M Hill, 2002).

In order to further the understanding of the urban nature component of the RiverLink study, a model developed by the Seattle Urban Nature Project was employed. This model recognizes that habitat value is inclusive of both the human and natural components of an urban landscape. The habitat types used in the analysis are described in detail on page 21.

WESTSIDE OF LONG BEACH
HISTORICAL VEGETATION

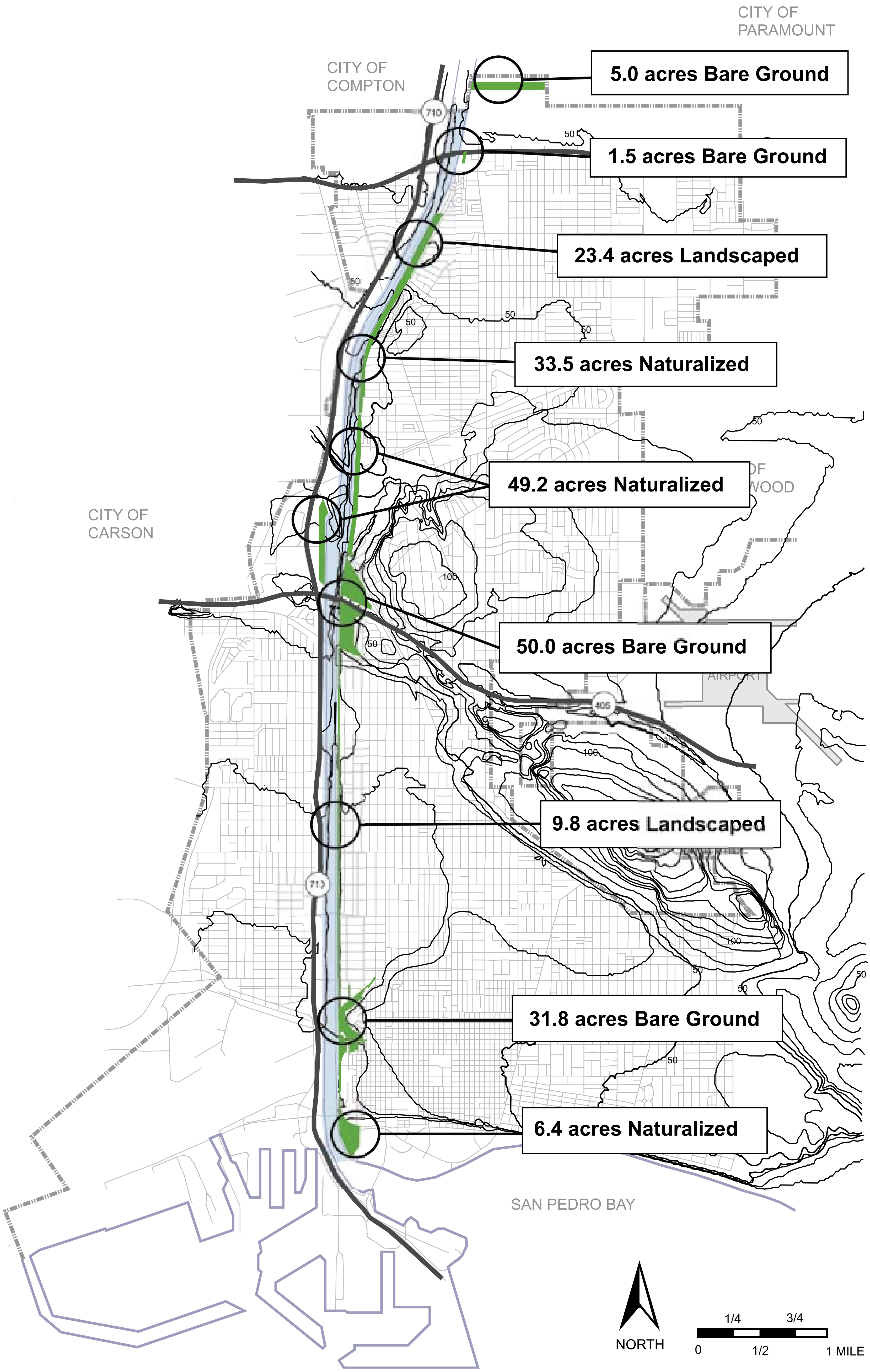
SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



WESTSIDE OF LONG BEACH

URBAN HABITAT OPPORTUNITIES ALONG THE LOS ANGELES RIVER

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



Bare Ground

Areas recently graded or disturbed that have not revegetated

Stream with Artificial Bed

Streams running through constructed channels of concrete, metal, or other impervious materials

Landscaped Grassland

Mown grass areas such as lawns or sports fields

Stream with Natural Bed

Streams running through channels of soil, gravel, or native rock

Landscaped Tree Savannah

10-25% tree canopy coverage (a few trees scattered over understory of mown grass or shaped shrubs)

Tidal Wetlands

Wetlands and estuarine tributaries whose hydrology is linked to tidal cycles

Landscaped Forest

Closed tree canopy over maintained understory such as lawns, trails or shrubs

Back Dune

Rocky to sandy dunes or gravelly beaches

Riparian Woodland

25% tree canopy coverage, with consistently moist soils and understory of water-adapted grasses and shrubs.

Grasslands

Unmown grasses, fields, or meadows

Emergent Wetland

Herbaceous plants growing in standing water or saturated soils

Shrublands

10-25% shrub cover (areas with shrubs scattered over unmown grass)

Deep Water Vegetated Wetland

Areas of open fresh water that have rooted plants such as waterlilies or cattails that protrude the surface

Tree Savannah

10-25% tree canopy coverage (a few trees scattered over shrubs, unmown grasses, or both)

Open Water Wetland

Unvegetated freshwater ponds with surface area smaller than 20 acres

Dense Forest

Over 25% tree canopy coverage with a developed understory of grasses and shrubs

Open Space/ Habitat Type	Acres	Bare Ground	Landscaped Grassland	Landscaped Savannah	Landscaped Forest	Riparian woodland	Emergent Wetland	Deep Water Wetland	Open Water Wetland	Lake / Pond	Stream W/ Artificial Bed	Stream W/ Natural Bed	Tidal Wetland	Back Dune	Grassland	Mulefat Shrub-land	Tree Savannah	Dense Forest
Edison ROW	5.0	■	□	□														
67th Street	1.5		■	■														
DeForest	23.4		■	■	■													
DeForest Wetlands	33.5					■	■					■						■
Dominguez Gap	49.2						■	■	■	■		■						
Wrigley Heights Park	50.0	■	□	□		□	□			■	□	□			□	□	□	□
Wrigley Greenbelt	9.8		■	■			□				□							
Drake Greenbelt	31.8	■	□	□	□		□				□		□	□				
Golden Shore Estuary	6.4												■					
Habitat Categories		**Developed**					**Constructed**								**Naturalized**			

■ Existing Habitat Types ☐ Potential Habitat Types

Habitat Classification Matrix

Analysis: The above matrix categorizes urban habitat into three classifications: developed, constructed, and naturalized. Developed habitats are areas defined as manicured landscapes such as recreational parklands. Constructed habitats are defined as areas built and maintained such as streams with artificial beds. Naturalized habitats are defined as areas remnant of natural conditions such as dense forest of native trees.

Design Opportunity: The matrix also indicates the potential habitats available for restoration within the Los Angeles River greenway. Based on the location of the spotlighted sites, occurrence of historic plant communities, and site potential, the design team anticipates restoration efforts will be limited to relatively small numbers of native habitats. Also, the greenway system will contain developed habitats dedicated primarily to human recreation activities. The restoration of native habitats within the RiverLink study area will serve as a regional demonstration as to the integration of native habitats into the urban fabric.

Following is a brief description of the habitat types and the potential open spaces being planned for in the RiverLink project.

Developed open spaces are planned for areas with human recreation and will have combinations of native and adaptive plants in park-like settings, with turf areas and shade trees.

Naturalized habitats are planned for areas in which native and adaptive plants can be established. Characteristic plants include oaks, coastal sage scrub and native grasses.

Riparian woodlands are planned for areas where perennial water sources are available. Characteristic plants include sycamore, cottonwood, and willow associations.

Artificial and natural bed streams are planned in areas with seasonal or perennial water sources.

Emergent and open water wetlands are planned for areas where shallow standing water can be detained or is currently collecting. Characteristic plant species include willow and cattails.

Tidal wetlands are planned for areas where tidal influences can be designed for. Characteristic plants include low herbs and shrubs, and some perennial grasses.

Back dunes are planned for areas where human access can be controlled due to the sensitive nesting needs of particular bird species. Sandy, rocky dunes and coastal bunch grasses characterize back dunes.

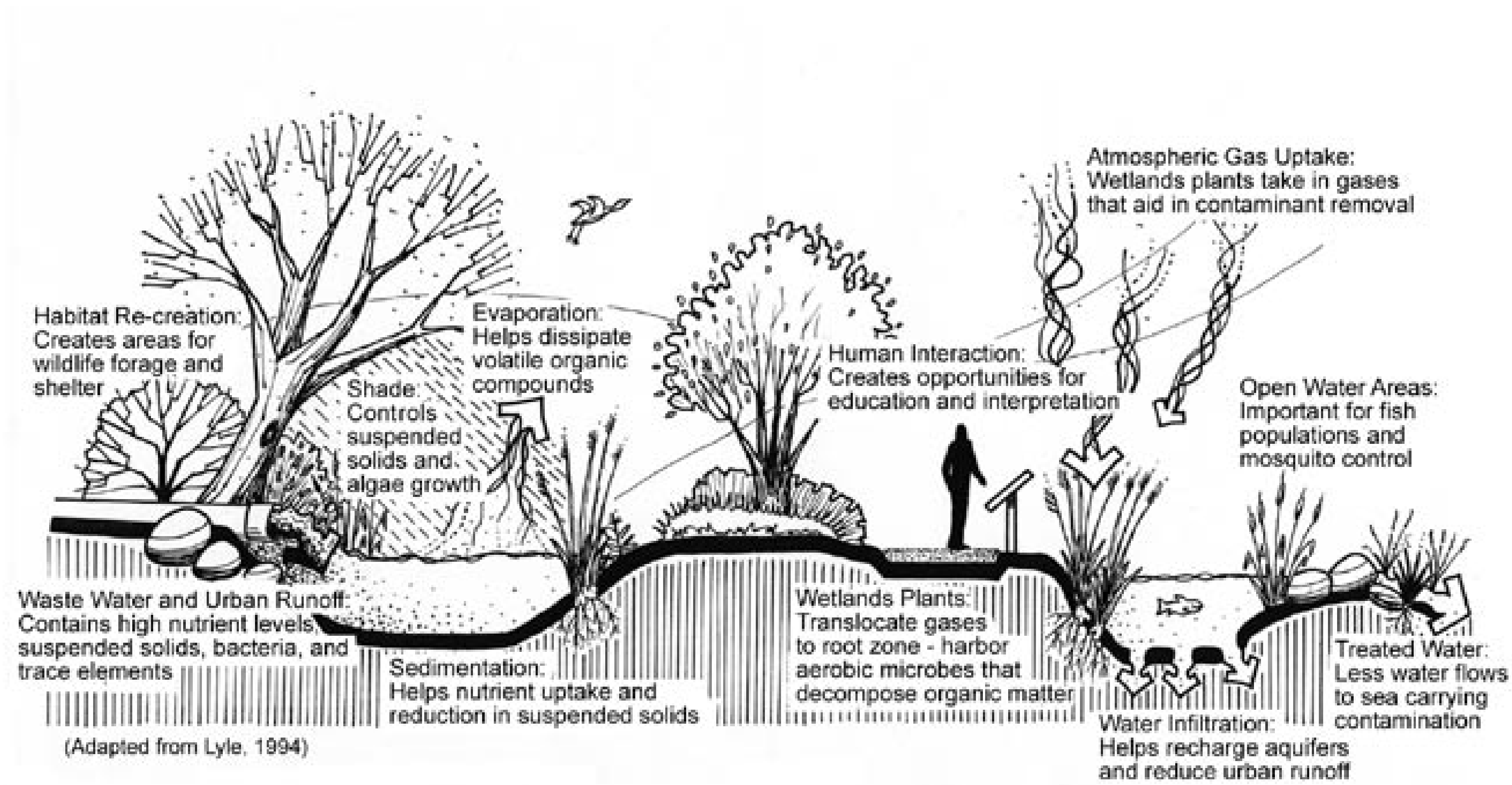
Dependent upon the habitat type, special features important for wildlife will be incorporated into the design of habitat sites. These special features are adapted from the CH2M Hill Feasibility Study completed in May of 2002.

Tall native trees, including willows *(Salix sp.),* sycamore *(Platanus sp.),* and cottonwoods *(Populus sp.),* provide nest and perch sites for migratory birds.

Mast producing trees, such as oaks *(Quercus sp.),* support many species of wildlife. However, it is not clear to what extent some mast producing trees historically occurred in the lowlands of the lower Los Angeles River Basin.

Barren islands are low islands that have little or no vegetation and are adequately protected from high water in spring

Nest boxes and snags attract cavity-nesting birds, owls, and bats.



The Benefits and Processes of Wetlands Restoration

Basking sites consisting of logs, clumps of vegetation, or small islands with little vegetation.

Native and adapted plants are important larval host plants for butterflies.

The aforementioned habitat types and special design features offer the greatest opportunity to reconstruct native habitats and offer opportunities to provide education and improve the quality of life for the residents of the westside of Long Beach. Avifauna species currently utilizing this reach of the Los Angeles River will benefit from increased habitat acres. These habitat patches provide critical additions to the Los Angeles River greenway. However, in order for the Los Angeles River greenway to function as a corridor for the migration of avifauna species, considerable efforts are needed upstream of the RiverLink study area. The application of the urban nature modeling process used in this study can assist in developing a series of habitat patches from the mountains to the sea. Appendix G is a complete plant list for the RiverLink project. Appendix D describes specific species associated with the habitats found in the study area.

Urban Forest

A major application of urban nature is the enhancement of the urban forest. The urban forest is the conglomeration of all the trees and other vegetation that grow in places where people live, work and play, from small communities in rural areas to large metropolitan cities. This includes trees on public and private land, along streets, in residential areas, parks and commercial developments, and in other locations within a community. They may be planted by design or grown by accident. (Miller, 1998)

Contiguous vegetation plays many important roles in a city such as improvement of air quality and the creation of habitat for wildlife.

A healthy urban forest provides many benefits to cities such as:

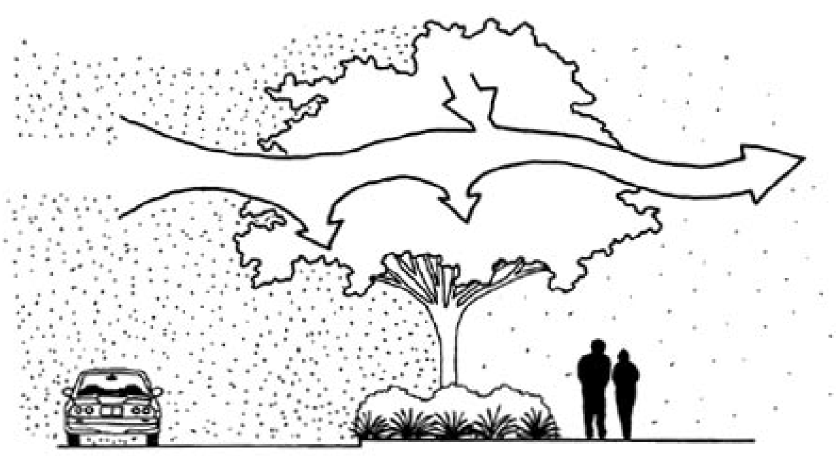
- Improvement of air quality
- Mitigation of the urban heat island effect
- Creation of wildlife habitat
- Reduction of stress in pedestrians as well as motorists
- Creation of noise buffers
- Traffic calming
- Increase in social and aesthetic values
- Creation of a “sense of place”

The development of an urban forestry program in Long Beach rests on three major factors, (Mock, 2003)

- Healthy Tree Resource
- Comprehensive Management
- Community-wide Support

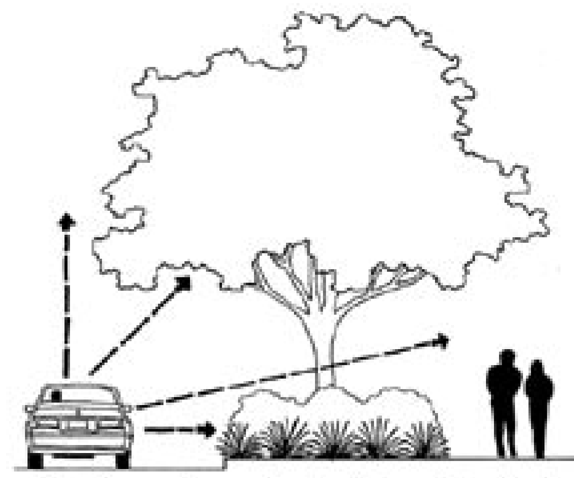
Analysis: Streets and parks in Long Beach, especially in the westside of Long Beach, are lacking in canopy trees as well as understory plantings. Because of this, the westside of Long Beach is experiencing high levels of air pollution at the pedestrian level, traffic conflicts between motorists, cyclists, and pedestrians, noise pollution in residential areas from nearby arterial roads, and a lack of substantial wildlife habitat. The streets themselves are ill- defined, creating undesirable views and stressful situations. As a typical example of the state of the urban forest in the westside of Long Beach, the design team analyzed Anaheim Street from the Los Angeles River to Pacific Avenue. The land use along this section of Anaheim Street is largely industrial, with

Air Quality



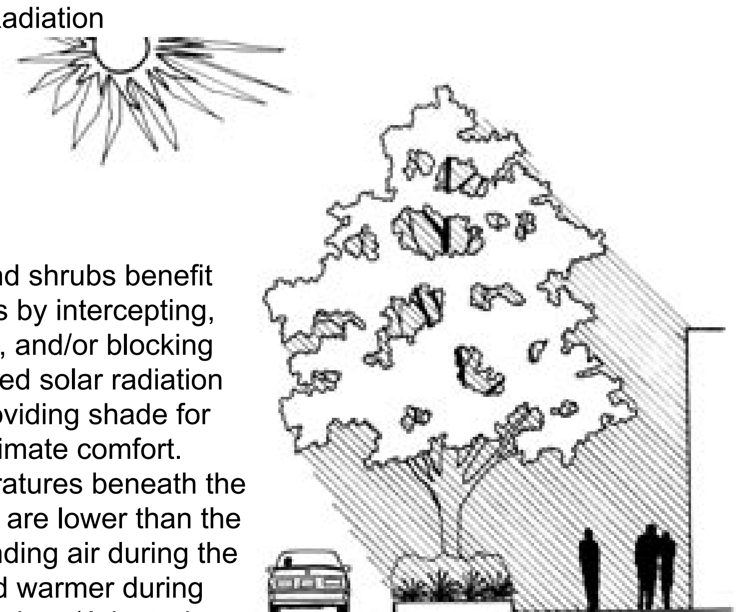
Tree and shrubs reduce air pollutants by oxygenation dilution process - giving off oxygen and water vapor.
(Adapted from McCullen and Webb, 1982)

Sound Mitigation



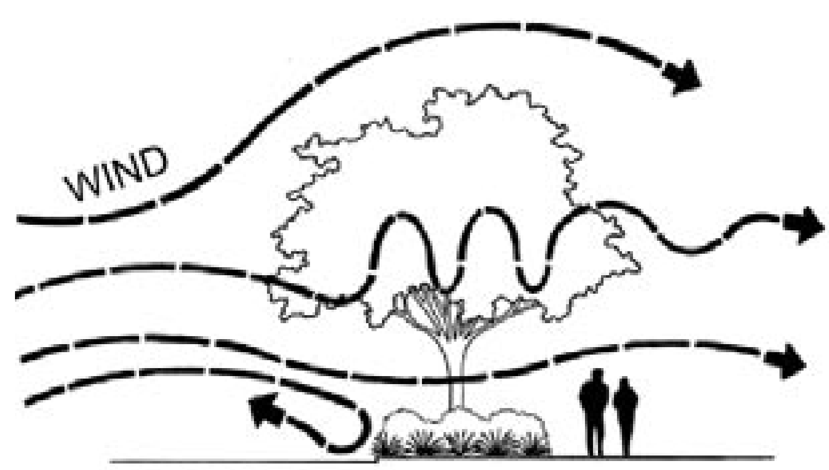
Tree and shrubs can form a barrier that affects sound by creating background noise of rustling leaves and wind through the branching that helps muffle other noise.
(Adapted from Grey, 1986)

Solar Radiation



Tree and shrubs benefit humans by intercepting, filtering, and/or blocking unwanted solar radiation and providing shade for microclimate comfort. Temperatures beneath the canopy are lower than the surrounding air during the day and warmer during the evening. (Adapted from Grey, 1986)

Wind protection



Trees and shrubs aid human comfort by filtering, reducing windspeed, and increasing the cooling process.
(Adapted from McCullen and Webb, 1982)

some light commercial, and it is a designated truck route. Careful inventory and analysis of existing vegetation shows the carbon storage and carbon sequestration rates (the rate at which the leaves of the trees absorb carbon from the air), as well as the pollutants removed by the trees.

Design Opportunity: Encouraging urban-tolerant plantings by the city as well as private landowners will have a drastic effect on the environment along Anaheim Street. Tree plantings will increase carbon storage and sequestration rates and remove far greater amounts of harmful pollutants than in the existing situation. The design of the streetscape as well as the air quality benefits gained by urban forestry can be found in the Pathways section.

Regular tree plantings will create a rhythm along the street as well as buffers between pedestrians and motorists that will slow cars down and minimize accidents. This will add to and improve the tree resources of the city. Community residents verified the need for enhancement of the urban forest in the visioning meeting questionnaire, giving their support for such a program. Perhaps the biggest concern for the development of an urban forestry program is a comprehensive management program consisting of representatives from multiple city departments, professional arborists, and the communities. For more detailed research on the benefits of the urban forest, see Appendix C.

Carbon Storage and Pollution Removal Data for Street Trees

Existing Planting on Anaheim St. between Los Angeles River channel and Pacific Ave.

	Tree Count	*Avg. DBH (in)*	*Carbon Storage (tons)*	*Carbon Sequestration (tons/year)*	*Ozone (O3) (lbs)*	*Sulphur dioxide (SO2) (lbs)*	*Nitrogen dioxide (NO2) (lbs)*	*PM10 (lbs)*	*Carbon monoxide (CO) (lbs)*
Existing Conditions	**9**	**9.40**	**0.37**	**0.01**	**0.30**	**0.10**	**0.20**	**0.30**	**0.00**

DBH = trunk diameter at breast height
PM10 = Particulate matter 10 microns or less in size

Cultural Setting

History

Humans have been utilizing the area for some 8,000 to 10,000 years, and have been an integral part of the south coast ecology for 2,000 to 3,000 years, thriving on the diversity of habitats from ocean and estuary to hills and scrublands, and intensively gathering resources. (USDA, 1997)

Human interaction with the environment of the Los Angeles River in and around the present-day city of Long Beach has been ongoing for 2,000 to 3,000 years. The Tongva Indians are known to have inhabited the area as early as circa 1000 A.D. These inhabitants had a very close connection to the river's ecology and the surrounding environment; they hunted game and gathered acorns and grains throughout the region. The Tongva people were adept at building canoes and traveled to other coastal villages and the Channel Islands. European discovery of the region came in 1542 when the Juan Rodriguez Cabrillo expedition claimed the area for Spain. In 1784, Spain issued a land grant to a decorated soldier, Manuel Nieto, forming the Rancho Los Nietos, which later split into the Rancho Los Cerritos and the Rancho Los Alamitos. The erratic river served as a boundary between the Rancho Los Nietos to the east and the Rancho San Pedro to the west; however that boundary changed yearly along with the floodwaters, causing disputes between the two ranchos.

The Rancho Los Cerritos was sold in 1866 to Lewellyn Bixby, a prominent real estate developer in Southern California. The first colonized city came in 1882 when William Willmore bought 4,000 acres from the Bixbys and developed Willmore City just east of the river, overlooking the floodplain. By 1888, William Willmore went bankrupt and left California, and the citizens of Willmore City renamed the town Long Beach, after the beautiful expanses of beach that characterized the area.

In 1902, Henry Huntington brought the Pacific Electric Trolley to Long Beach, connecting the city with the thriving Los Angeles area. This spurred great development in Long Beach, which by 1910, was the fastest growing city in the nation and the third largest city in the county, with a population of approximately 18,000 people. As the population grew, so too did industry, and both had a drastic effect on the Los Angeles River, which originally emptied into the Port of Long Beach. Flooding in 1914 silted up the ports to the point that the channels were unnavigable, spurring the need for a comprehensive flood control program. This was certain doom for the natural course of the river, which was then relocated to a flood channel approximately one mile east of the original watercourse. Blake Gumprecht explains the significance of this event:

> By 1921, the single-most important project, the diversion of the Los Angeles River away from the harbor — called the raison d'être of flood control in Los Angeles County by one scholar — was completed. The river's mouth was shifted one mile east, where a rocky jetty extending into the ocean was built to prevent silt from accumulating at the entrance of Long Beach Harbor. The total cost of the project was \$3.3 million, with the federal government and Los Angeles County each paying about half. (Gumprecht, 1999, p.191)

That same year, oil was discovered on Signal Hill, an event that drastically shaped the economics of Long Beach. The oil derricks, many of which are still in production, can be seen from great distances across Long Beach. The downtown boomed and the city grew to a population of 140,000 by 1930. The earthquake of 1933 destroyed much of downtown, which was rebuilt in the Art Deco style of the times. This style spread out from downtown to other reaches of the city and its influence is still apparent today. As the city spread and the population increased, the flood control systems of 1914 became inadequate.

> Flood control planners lacked the resources of private developers and did not have the legal authority to prevent homes from being built in flood-prone areas. The result was that flood control construction simply could not keep pace with the growth of the metropolis. This created an environment ripe for disaster (Gumprecht, 1999, p.247-250).

Mouth of Los Angeles River, 1921 (Source: County of Los Angeles Dept. of Public Works, 2003)

Los Angeles River before channelization (Source: County of Los Angeles Dept. of Public Works,, 2003)

Major floods hit the Los Angeles basin in 1938 causing severe damage along the entire course of the Los Angeles River. In response, the USACE began to construct concrete walls and beds for the river and its tributaries. By 1954 they had completed the channel down to Long Beach; today, 94% of the river runs through a concrete channel. The character and ecology of the river was forever changed by channelization.

In 1967, Long Beach purchased the famous cruise liner the Queen Mary and docked it at the mouth of the Los Angeles River as a tourist attraction. A decade later the city began a massive downtown redevelopment project slated to continue through to the year 2000. As part of this redevelopment effort, the Convention and Entertainment Center opened in 1978, and in 1982, the mixed-use Shoreline Village development, the Downtown Shoreline Marina and Shoreline Park all opened. The Long Beach World Trade Center, which can be seen along the Los Angeles River as far north as Wardlow Road, opened its doors in 1989, and the following year the first link in the Los Angeles Metro Rail Project, the Metro Blue Line, was completed from downtown Los Angeles to downtown Long Beach. As a capstone to the redevelopment efforts that began in the 1970s, the Aquarium of the Pacific was completed in the mid-1990s, becoming the largest such project undertaken in Southern California at that time.

These events have culminated to create the cultural identity present in Long Beach today. This history allows the design team to understand the factors that shaped the formation and development of Long Beach and its relationship with the Los Angeles River.

Current Demographics

Long Beach prides itself on being a diverse city. From the 2000 census, the design team investigated current demographics of the westside of Long Beach council districts to see how Long Beach's ethnic makeup would inform design solutions. This illuminated several trends and gave the design team a general feel for the cultural diversity of the westside of Long Beach.

Long Beach has become the most ethnically diverse city of the 65 largest in the nation and has added 100,000 new residents to their community (City of Long Beach, 2002a). From 1973 to 2000, Long Beach's population has risen over 28%. Long Beach's population is estimated to rise from the 2000 figure of 461,522 to 490,405 as of 2010—a 9.4% increase. This population increase, larger family sizes, and slowed housing development have resulted in increased population densities. The population densities are not evenly distributed throughout Long Beach, as the westside of Long Beach is dramatically denser than the Eastside.

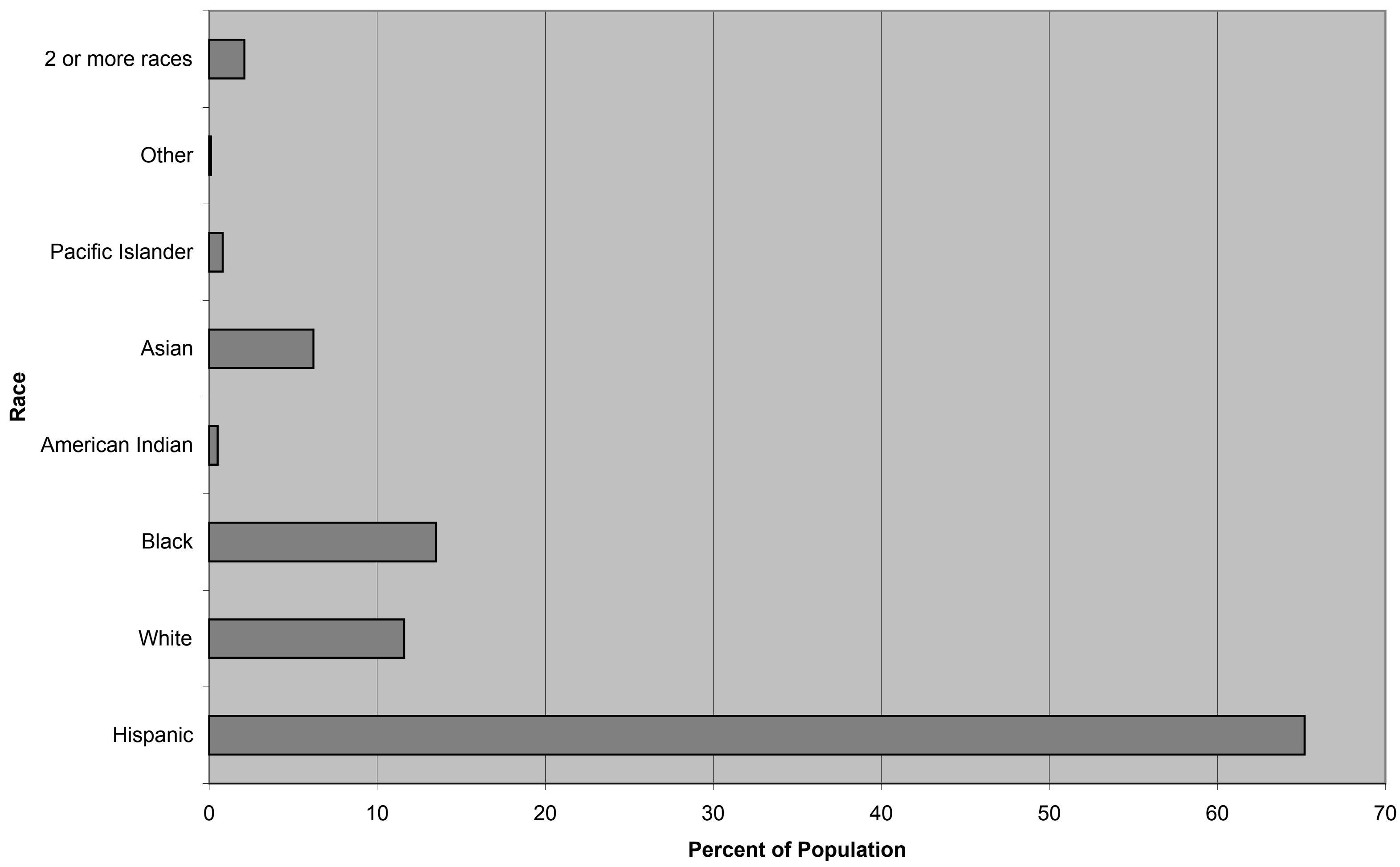
The westside of Long Beach's predominant ethnic group is Hispanic. In almost every Westside district, the Hispanic population was over 30%, and in the case of the first, sixth, and ninth districts, the density was 65.2%, 49.6% and 48.8% respectively. The other major ethnicities represented were Asian, Black, and White. After Hispanic, these groups were generally at parity with each other in the westside of Long Beach as a whole.

The average resident age for the westside of Long Beach is 28.7 years, with the first and sixth districts having median ages of 25.7 and 24.3. Children under the age of 18 make up over 30% of the population in the first, sixth, eighth, and ninth districts. This demonstrates a very young population in the westside of Long Beach.

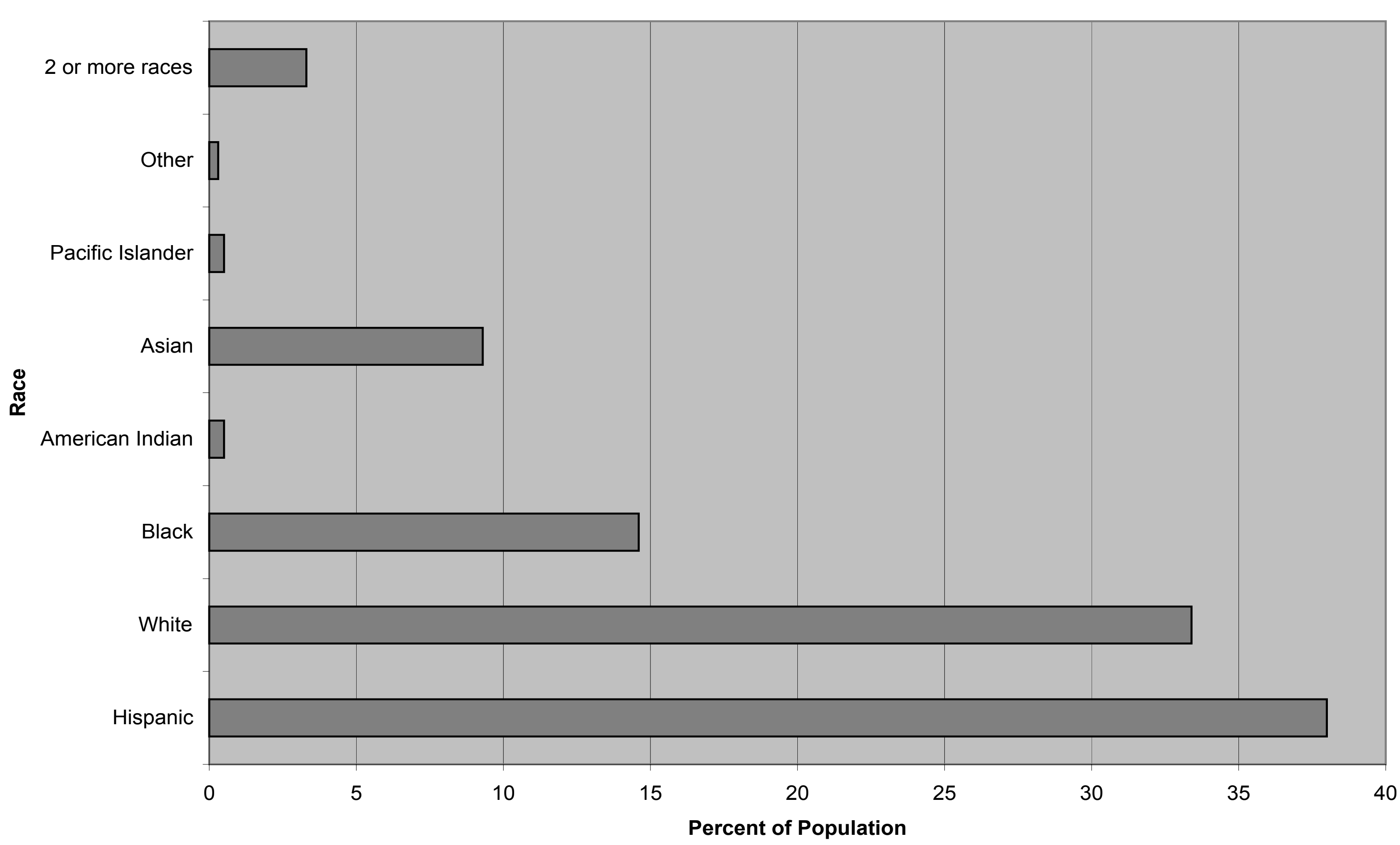
Finally, the design team looked at housing patterns in every district, and found high percentages of renter-occupied housing over owner-occupied, except for the seventh district. The seventh, eighth and ninth districts have renter-occupied housing percentages over 40% and in the first, second, and sixth districts the percentage is over 70%.

Several trends are evident about the westside of Long Beach demographics. The westside of Long Beach generally has large majorities of young Hispanic couples with children under the age of eighteen who rent their homes. This poses a challenge for the placed-based planning method and is a possible reason for the low turnout at the community outreach meetings; it suggests a high turnover in occupancy in the neighborhoods that does not promote community stewardship for public spaces. It was clear from the demographics and discussions with community leaders that significant areas of flexible open space are needed for large gatherings to accommodate large extended family groups. Due the preponderance of young families, the design team felt there was a need to accommodate play areas and green spaces for youth activities.

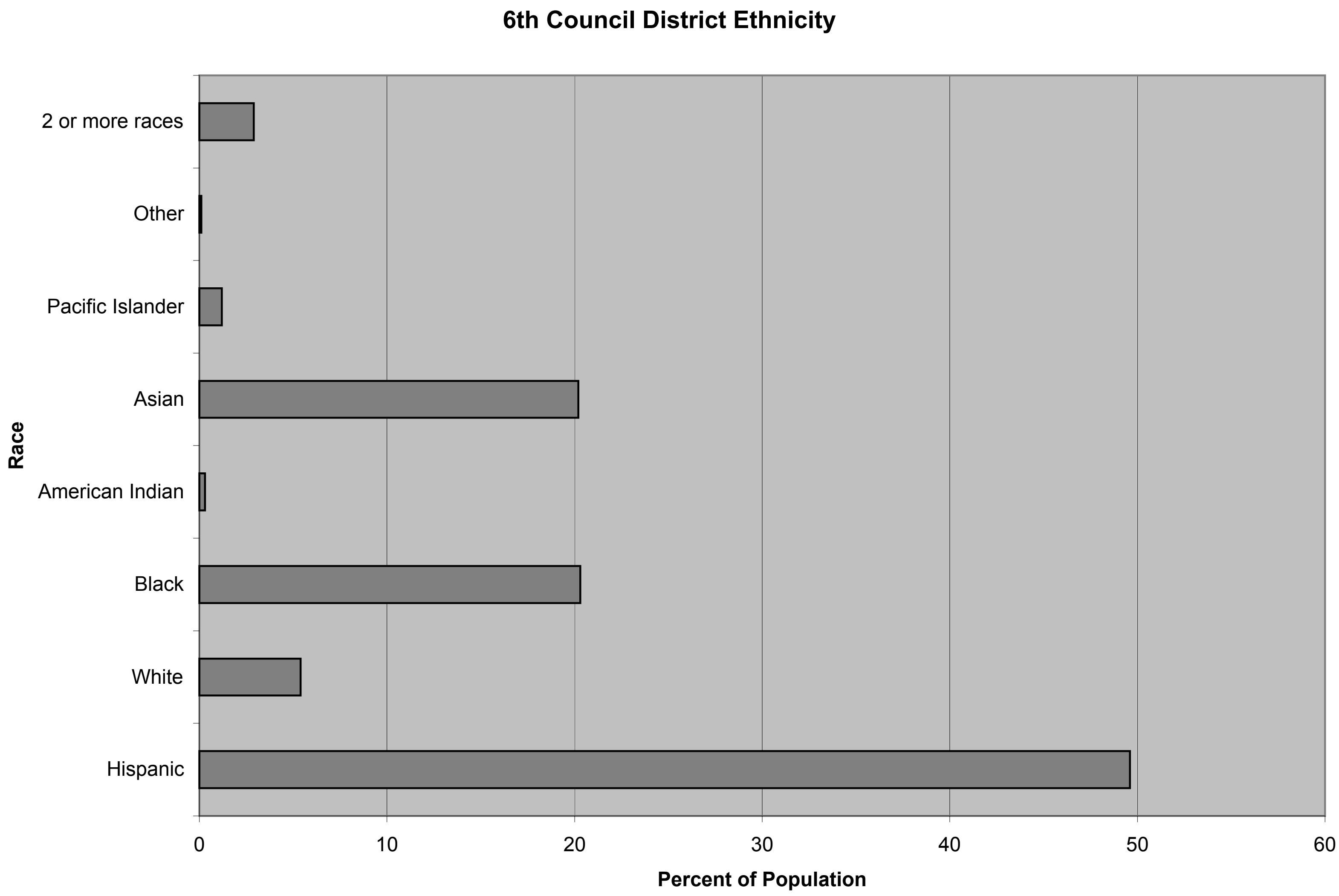
1st Council District Ethnicity

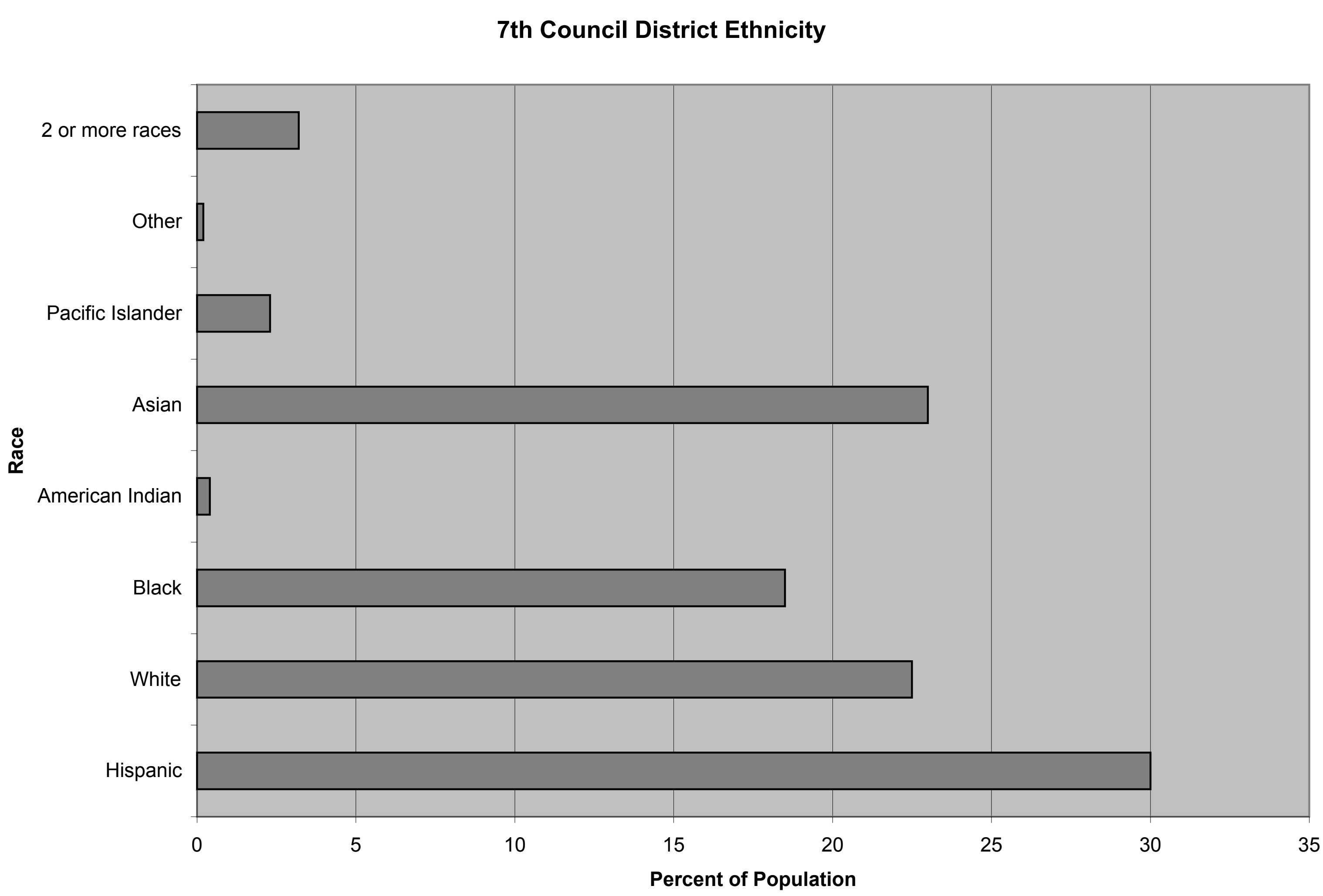


2nd Council District Ethnicity

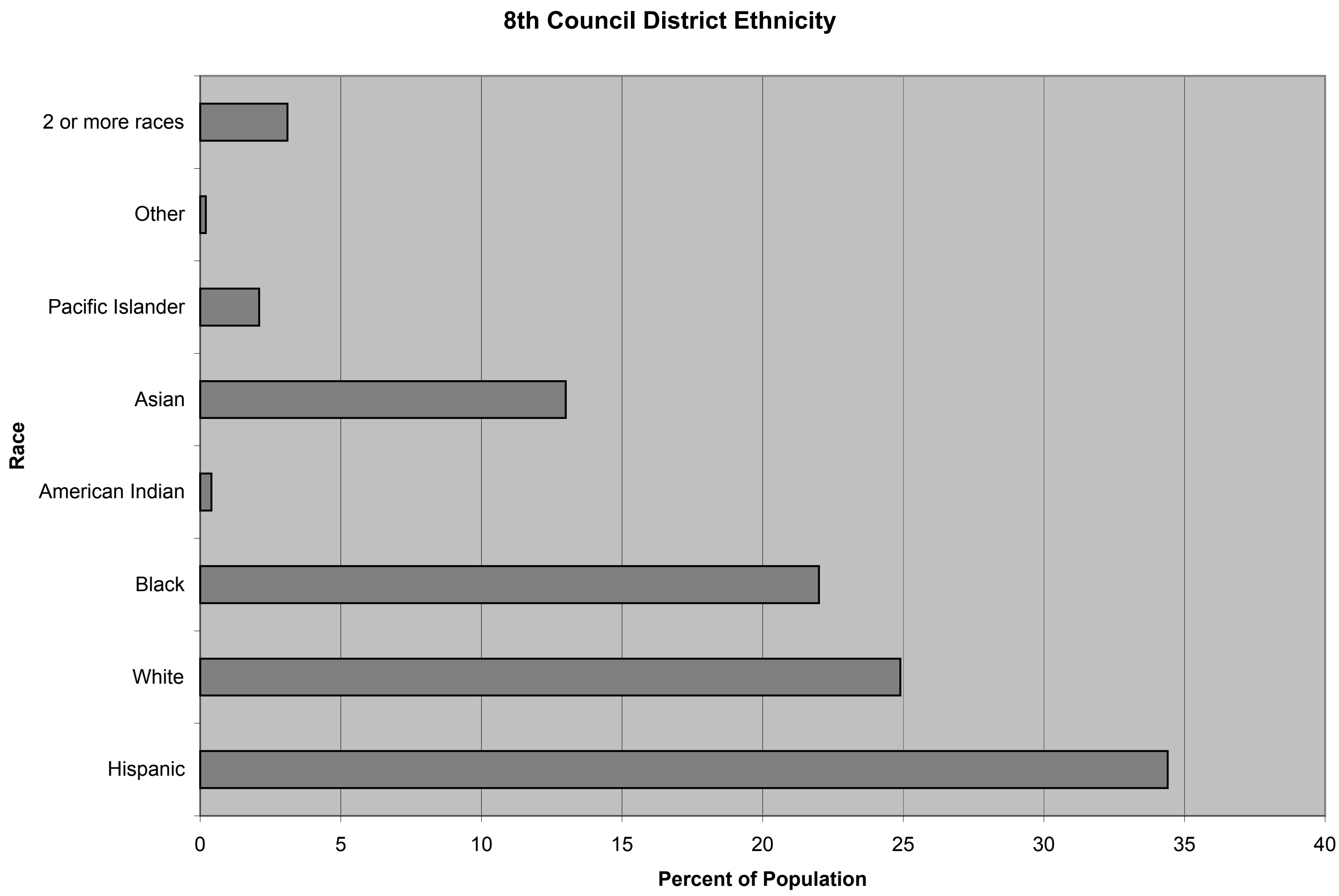


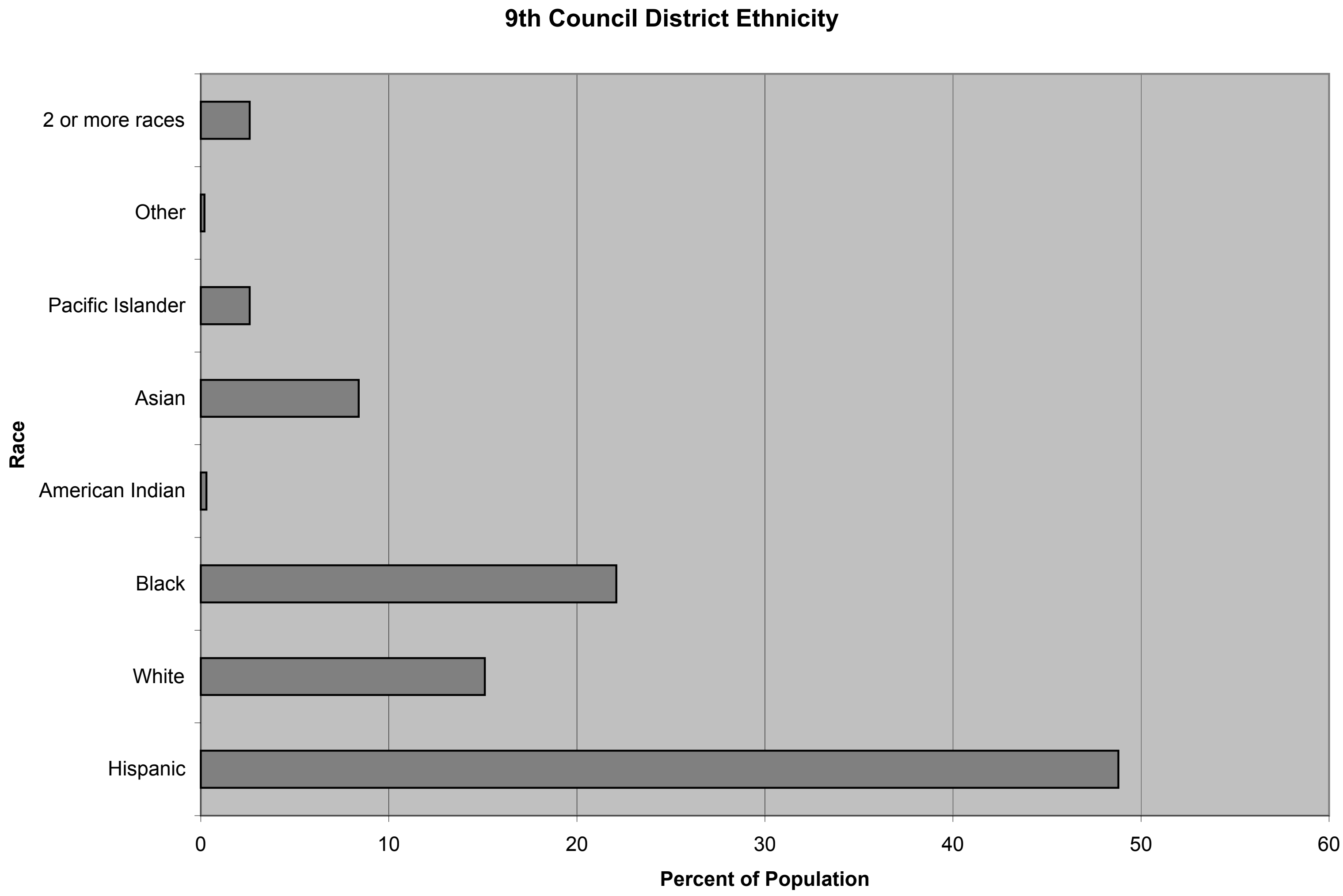
(Source: U.S. Bureau of Census, 2000)



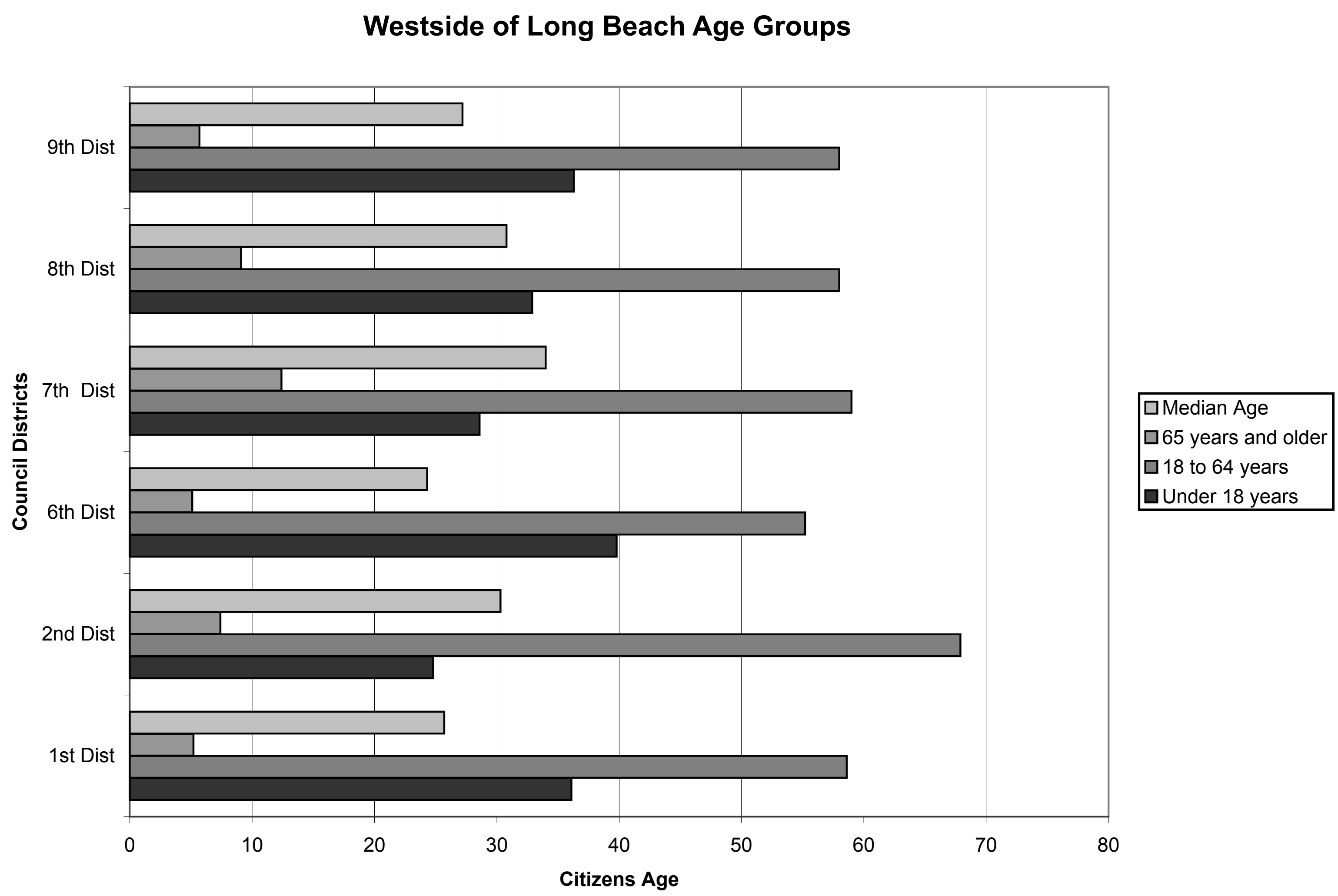


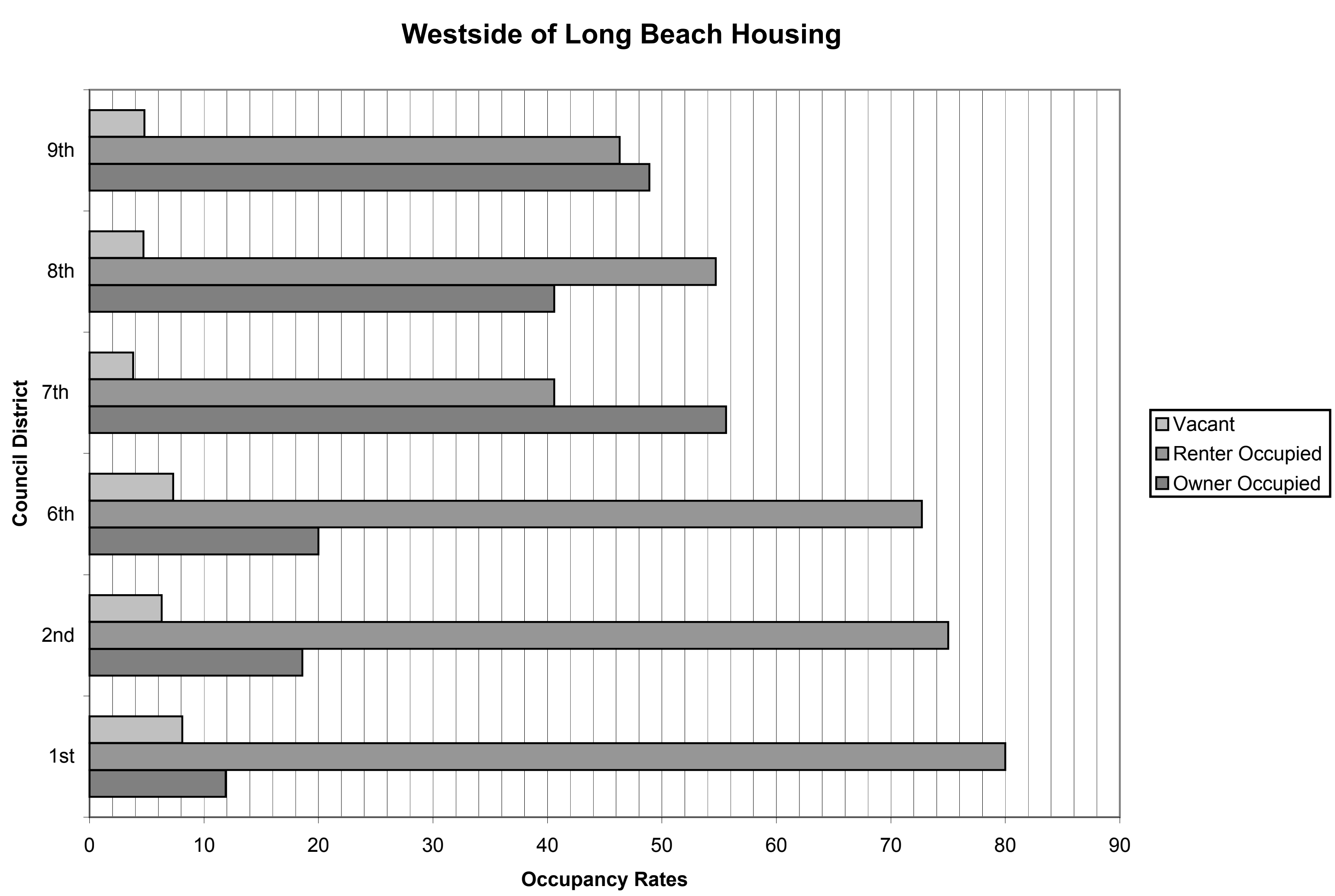
(Source: U.S. Bureau of Census, 2000)





(Source: U.S. Bureau of Census, 2000)





(Source: U.S. Bureau of Census, 2000)

Previous Plans

Several planning documents provide goals and guidelines at different scales that the RiverLink project must address. These documents include the following:

- *Common Ground from the Mountains to the Sea*, was developed in 2001 by the California Resource Agency (CRA) and the Santa Monica Mountains Conservancy (SMMC) to support and inform regional planning agencies conducting open space projects within the Los Angeles River and San Gabriel River watersheds.

- In 1996, the County of Los Angeles Board of Supervisors adopted the *Los Angeles River Master Plan* (Los Angeles County Dept. of Public Works, 2003). It provides for the optimization and enhancement of aesthetic, recreational, flood protection and environmental values by creating a community resource, enriching the quality of life for residents and recognizing the river's primary purpose for flood protection (Los Angeles County Dept. of Public Works, 2003).

- The 2010 Strategic Plan adopted by the City of Long Beach has outlined numerous goals to help it become a more sustainable city, socially, economically, and environmentally.

The San Pedro Bay Estuary Project will have a greater chance of acquiring funding for implementation if the RiverLink document works within the goals and principles of larger regional and local planning efforts.

Infrastructure

Parks and Open Space

Open spaces are an important contributor to the quality of life in cities. Open spaces provide residents opportunities to escape urban life, reflect, play, and reconnect with nature. The leadership of Long Beach recognizes the importance of open space and considers the expansion of the open space system in Long Beach a priority. In the fall of 2002, the Long Beach Department of Parks, Recreation, and Marine adopted an Open Space and Recreation Element of the General Plan to guide their efforts in acquisition and development of open space.

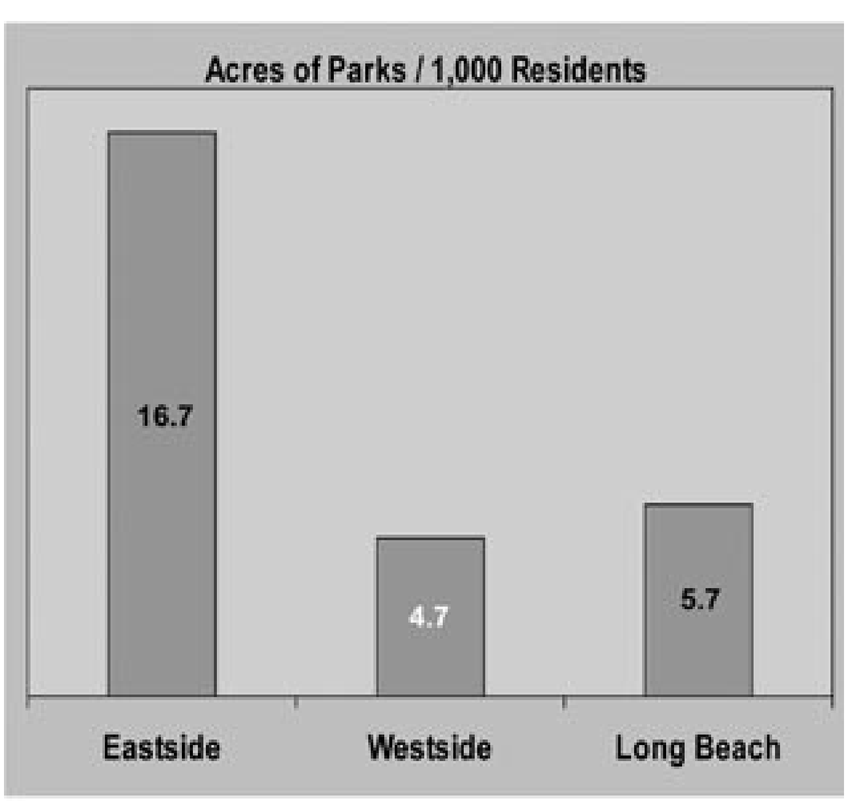
In a recent survey conducted by the Long Beach Department of Parks, Recreation and Marine, 97% of the residents surveyed responded that "preserving the environment and providing open space" was an important role for the Department to undertake, as well as "enhancing the appearance of the city," which 96% of those surveyed supported (City of Long Beach, 2002c, p. 6).

The city's available open space has not kept pace with the increased population densities. According to Long Beach officials, in 1973 the ratio of open space to population was 7.0 acres per 1,000 residents. Today, that ratio has declined to 5.7 acres. To further compound the decline, the majority of open space is located in the eastside of Long Beach while density increases have occurred in the westside of Long Beach.

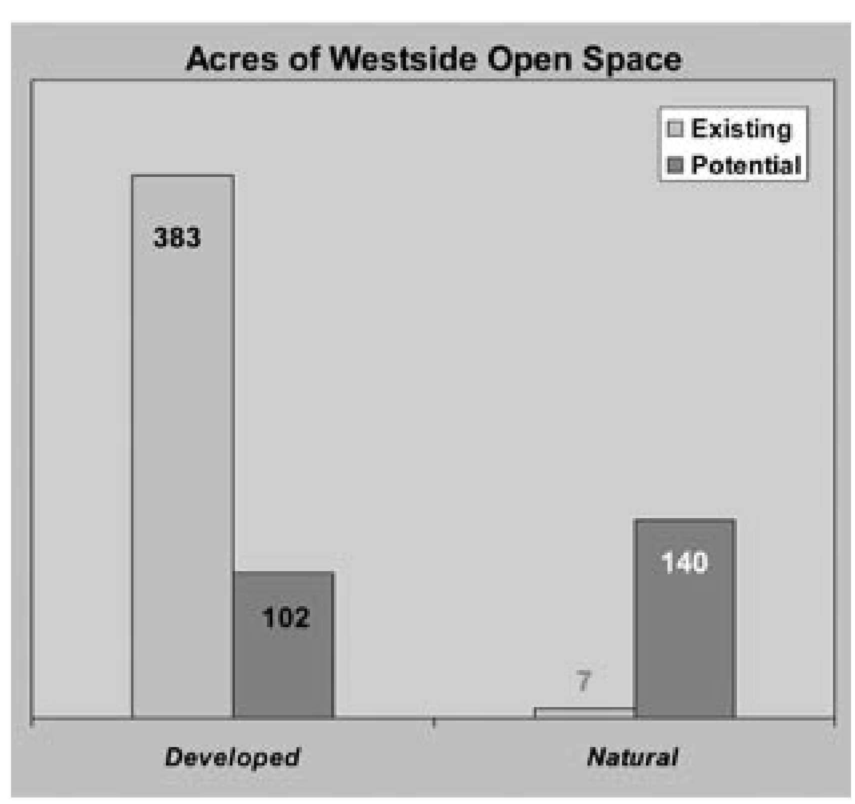
Today, Long Beach has established a goal of eight acres of open space per 1,000 residents. This target was calculated based on a comparison to other American cities of similar population densities, and recommendations from the National Recreation and Parks Association 1995 guidelines (City of Long Beach, 2002c). Based on the 2000 population of 461,522, the city needs a total of 3,692 acres of open space. Currently the city offers a total of 2,613 acres of open space. The westside of Long Beach currently has approximately 340 acres of designated open space. This is 15% of the total parkland in Long Beach and translates to just over one acre per 1000 residents. Furthermore, with the expected 9.4% increase in population by 2010, the need for public open space will become even more severe.

In order for the city to meet its target of 8.0 acres per 1,000 residents Long Beach needs an additional 1,080 acres. This poses the question of how will Long Beach be able to provide this amount of open space in a fully developed, densely populated city of nearly half a million residents.

The strategies the city has adopted to meet the open space need include the following: acquire vacant parcels, create partnerships with public agencies for use of railroad or utility corridor rights-of-way (ROWs) and other easements, and for use of schoolyards for community recreational opportunities (City of Long Beach, 2002c). These efforts, of which the RiverLink project is part, are expected to provide an additional 960 acres of open space once fully implemented. The City of Long Beach seeks additional assistance in locating and creatively integrating the remaining 120 acres into the expanded park system.



(Source: City of Long Beach, 2002)

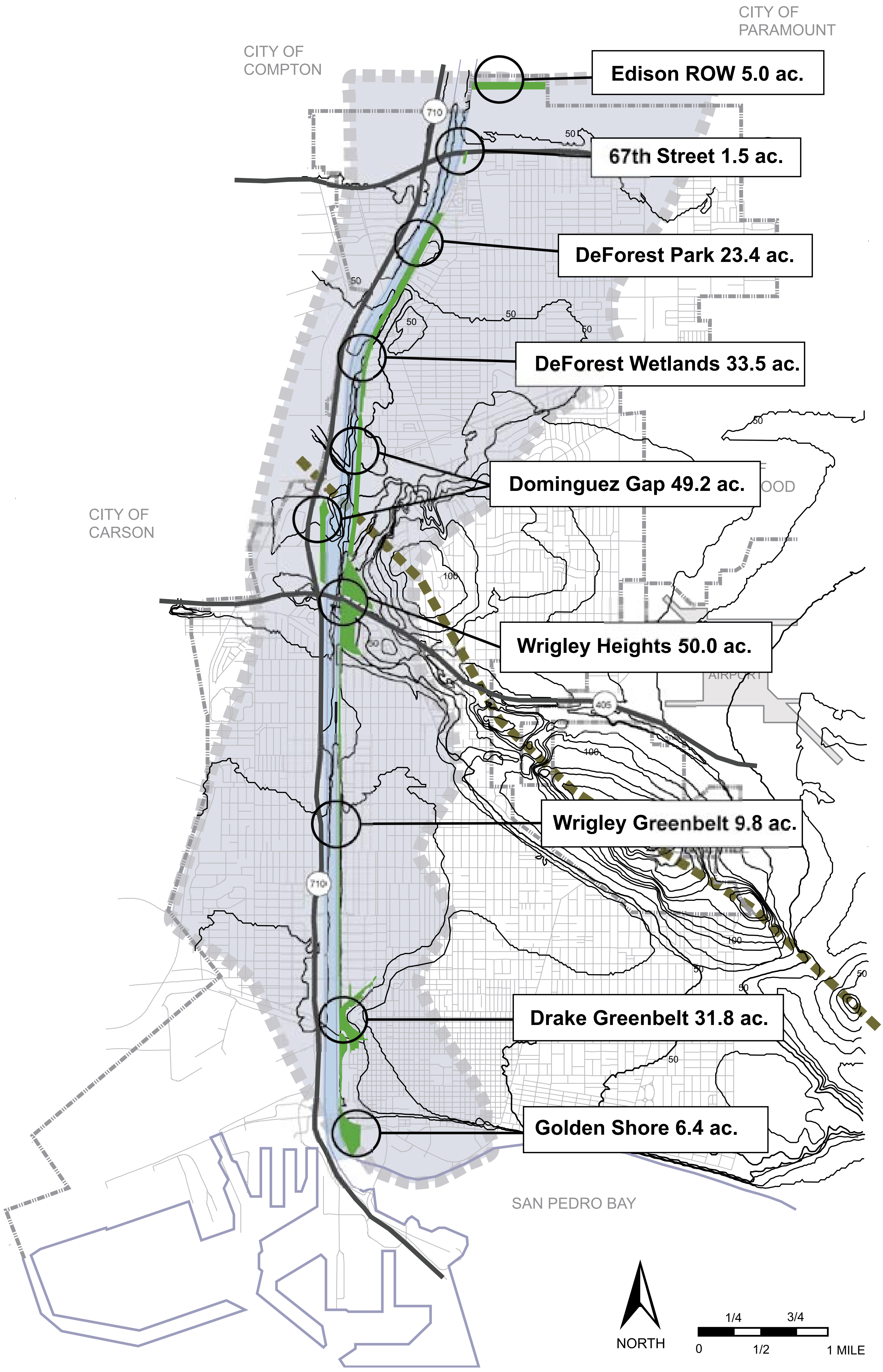


(Source: City of Long Beach, 2002)

WESTSIDE OF LONG BEACH

PARKS AND OPEN SPACE OPPORTUNITIES ALONG THE LOS ANGELES RIVER

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



Urban Transportation

Long Beach is an automobile-dominated urban area and will likely remain so. However, the dense nature of the urban grid is well suited to other modes of transportation such as mass transit, walking, or bicycling. Currently, the urban mosaic is not structured to promote this type of transit. The unclear street network makes it difficult for bicyclists and pedestrians to determine safe and direct routes to neighborhood activity nodes such as schools, parks, and shopping. Community residents noted that their largest concern was creating a network of continuous and connected pedestrian and bike routes interlacing the neighborhoods with the Los Angeles River greenway.

Vehicular traffic in the westside of Long Beach has degraded the air quality significantly. The South Coast Air Quality Management District (AQMD) conducted the Multiple Air Toxics Exposure Study in 2001 (MATES-2), to estimate the health risks posed by air quality for the Los Angeles basin. The study found that because of poor air quality, Long Beach residents face a greater risk of cancer than people in most other parts of the region, even those located near refineries and heavy industry. Mobile sources, such as cars, trucks, trains, ships, and aircraft are responsible for approximately 70% of the health problems. Significant parts of the westside of Long Beach, including downtown and neighborhoods along the Los Angeles River are placed in the study's highest risk category, translating to a risk of 1,200 in a million of contracting cancer over a 70-year exposure. This is mostly attributed to heavy freeway traffic on the I-710 and I-405 freeways, shipping activity at the ports, and associated industrial uses on the west bank of the river (SCAQMD, 2001).

The opportunity exists to promote alternative means of transportation such as walking and bicycling as functional and recreational means for moving about the westside of Long Beach and to the river. Better bicycle and pedestrian access will increase the enjoyment and quality of life for the residents of Long Beach and will help to improve the local air quality by reducing the number of vehicular trips by residents.

Bicycling and walking are two of the most popular forms of recreational activity in the United States; 46% of Americans bicycle or walk for pleasure. Based on 1995 data, we can assume that of the 425,000 Long Beach residents, approximately 195,000 of them would bicycle and walk for pleasure. (City of Long Beach, 1991)

Based on the roadway classification in the Long Beach General Plan, the design team designated selected roadways as appropriate for different types of transportation use. The types of transportation routes in Long Beach, which are significant for this study, are described below.

Regional corridors are roads intended for movement across the region or between cities.

Major arterials are roads intended to serve as a major traffic routes within Long Beach and to adjoining cities.

Minor arterials are roads intended to facilitate traffic and movement between neighborhoods. They distribute traffic from major arterials to subordinate streets such as collectors.

Collector streets are roads that link smaller local streets to arterials and serve trips within local neighborhoods.

Parkways are linear stretches of land typically along a roadway or waterway, and can vary in width.

Greenways are linear stretches of land maintained as public open space to conserve natural and cultural resources, provide recreational opportunities, enhance aesthetic qualities and provide linkages between associated parks and open spaces.

Class I bike paths provide a completely separated right of way for the exclusive use of bicycles and pedestrians with minimal traffic crossings. They are typically 10–12 feet wide and are appropriate where there is adequate right-of-way to provide a car-free environment for a large portion of a bicycling trip. They are also effectively used to close gaps in a route such as connecting two dead-end roads or traversing parks.

Class II bike lanes are striped lanes on a roadway for the exclusive use of bicyclists, with certain regulated exceptions. The lane provides additional width in order to better accommodate bicyclists. Bike lanes are generally not appropriate on streets that have angled parking, high on-street parking turnover, steep downgrades, and surface or pavement interruptions.

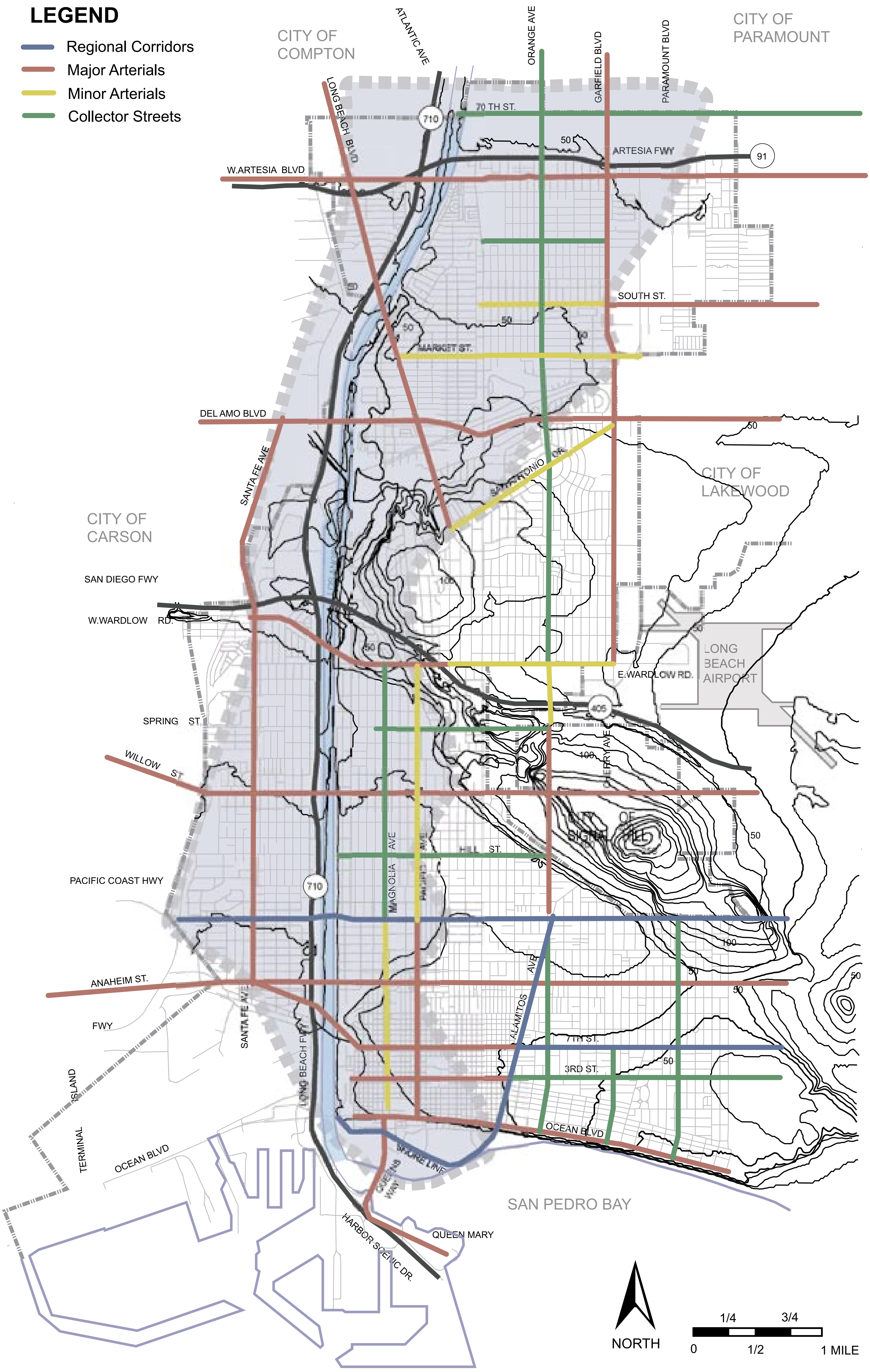
Shared roadways (Class 2.5) are roadways signed and improved as bikeways because they provide direct access to major destinations. This designation requires the removal of unsafe drainage grates and other impairments, restriping for wider curb lanes, signal retiming for safe bike clearance intervals, "Share the Road" signage and pavement stencils, and the increased enforcement of posted speed limits.

Class III bike routes are roadways signed as bikeways because they provide continuity in the overall bikeway network or because they are somehow preferable to immediately adjacent streets. This designation requires signage denoting the bike route but does not need any improvement of existing road infrastructure.

WESTSIDE OF LONG BEACH

STREET CLASSIFICATIONS

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



Transit / Corridor	Atlantic	Market	Del Amo	Del Mar	Wardlow	Spring	Willow	Hill	PCH	Anaheim	7th	Pacific	Daisy
Corridor Designation	Major Arterial	Minor Arterial	Major Arterial	Major Arterial	Major Arterial	Collector	Major Arterial	Local	Regional Corridor	Major Arterial	Major Arterial	Major Arterial	Collector
Pedestrian	Moderate	Most	Least	Moderate	Moderate	Most	Moderate	Most	Moderate	Least	Moderate	Moderate	Most
Automobile	Most	Moderate	Moderate	Moderate	Moderate	Least	Moderate	Least	Most	Most	Moderate	Moderate	Least
Bicycle Class I	Least	Least	Least	Least	Least	Least	Least	Least	Least	Least	Least	Least	Least
Bicycle Class II	Moderate	Moderate	Moderate	Moderate	Moderate	Most	Moderate	Most	Moderate	Moderate	Moderate	Moderate	Most
Bicycle Class III	Moderate	Moderate	Moderate	Moderate	Moderate	Most	Moderate	Most	Moderate	Moderate	Moderate	Moderate	Most
Bicycle Boulevard	Least	Least	Least	Least	Least	Moderate	Least	Moderate	Least	Least	Least	Least	Most

Transit Suitability Matrix

Bicycle boulevards are roadways that have been modified to enhance bicyclists' safety and convenience. They provide better conditions for bicycles while maintaining the neighborhood character and necessary emergency vehicle access. Additional treatments would likely include distinctive and informative signage and perhaps pavement markings to indicate to cyclists that they are on a bike boulevard. Where major arterials cross bike boulevards, traffic signals are installed so that the arterial can be easily crossed. Where appropriate, stop signs are rotated so that the bicycle boulevard will have the right of way. In some cases, traffic-calming measures such as traffic circles or semi-diverters can be installed. If needed, on-street parking can be reduced to create more room for bicyclists.

Multi-use paths are paths along roadways designed to accommodate both pedestrians and bicyclists. The purpose of this designation is to allow both pedestrians and bicyclists access to major transit connections along arterials which are unsafe for bike traffic, generally because of high speed vehicular traffic or designation of the road as a truck route. Bicycles on multiuse paths must ride slower to accommodate pedestrians.

Pedestrian Movement

Analysis: Pedestrian travel in the westside of Long Beach occurs mostly within the neighborhoods and along developed routes such as Los Angeles to Rio Hondo Bikeway (LARIO) on top of the channel berm; however pedestrians are not always welcome on the bikeway. Few people walk along the major roads in the city because of the narrow sidewalks, uneven pavement, fast and high volume traffic, and lack of shade and amenities along the streets.

Design Opportunity: Pedestrian movement can be enhanced through careful streetscape design promoting safe pedestrian use of the sidewalk. Pedestrians will be able to walk from their neighborhoods, along city streets, to the parks and amenities associated with the river greenway.

Bicycle Transit

Analysis: The nature of the urban fabric dictates that the RiverLink project promotes bicycle access around the westside of Long Beach and to the Los Angeles River greenway. The City of Berkeley has developed a draft Bicycle Master Plan (1998) that recognizes different types of bicyclists based on age and experience level, which may serve as a future model for Long Beach.

> Bicyclists can be loosely categorized as experienced adult, casual adult and child cyclists. Some experienced cyclists eschew bike lanes, some cyclists will ride on busy roads only if bike lanes are provided, some will ride in bike lanes all the time and some will ride in bike lanes only if parallel residential roads are unavailable (City of Berkeley, 1998, p.4-1).

Design Opportunity: The built-out nature of the westside of Long Beach restricts the creation of new bike paths, however Class II bike lanes will be incorporated to connect the neighborhoods to the Los Angeles River greenway. To promote an integrated bicycle network, Class III bike routes will be designated and signed. These routes will serve to more fully connect the neighborhood residents into the bicycle infrastructure. To further encourage bicycle use in Long Beach, bicycle boulevards will be designated to create north-south spines paralleling the river greenway. If adopted, the design team anticipates that the reduced and slowed traffic on the bicycle boulevards will induce many adults and children to ride who are intimidated by automobile traffic. Residents living on these streets will benefit from the traffic on their street being "calmed," thus making it a more livable place.

Mass Transit

Analysis: Long Beach has historically been connected to Los Angeles by trains; early railroad pioneers made a point of connecting the burgeoning city into the rest of the Los Angeles basin because of its ports and agricultural importance. In 1990, the MTA extended the Metro Blue Line light rail to Long Beach to assist commuters between there and Los Angeles. The Blue Line enters the city from the northwest and stops periodically within the city on its way to downtown, where it makes a small loop. The network of Metro buses spans the city and connects all the major destinations within the city. Major hubs are at the Blue Line stations and the Bike Station downtown. The Long Beach Bike

Station was located at the terminus of the Blue Line to work in conjunction with the mass transit network. The station may have to be relocated because of downtown development interests.

Design Opportunity: Fitting the RiverLink plan into the existing mass transit infrastructure can optimize use of the existing network and encourage multimodal transportation utilizing bicycles, buses, and trains.

Automobile Transit

Analysis: Long Beach, like most U.S. cities, is dependant upon the automobile. Realizing that this will not change until society changes, certain roads will be designated as auto-oriented roadways. This will give those who need a car, such as the elderly and the handicapped, easy access to the Los Angeles River greenway, as well as provide opportunities for visitors from outside of Long Beach to enjoy the amenities located along the river.

The I-710 freeway stretches along the west bank of the river south to Seventh Street, where it crosses the river and empties into downtown Long Beach. Due to expansion plans for the port of Long Beach, plans are under consideration to expand the freeway, which is a major truck and container route to the ports. The plans include the possibilities of interchange redesign, designation of truck-only and carpool lanes, addition of a second tier to the freeway, and addition of a passenger rail along the freeway. All expansion strategies would increase vehicular noise and emissions, adversely affecting the RiverLink project. Future connectivity to the river from the west bank would be impaired by severed visual and physical connections, as well as the loss of potential park sites.

Design Opportunity: To provide automobile-oriented access to the Los Angeles River greenway, specific streets can be oriented toward increased vehicular traffic. This will insure universal access to the river greenway and its associated parks. Creative measures will be taken to reduce airborne pollution and mitigate the health risk associated with poor air quality.

Industrial Contamination

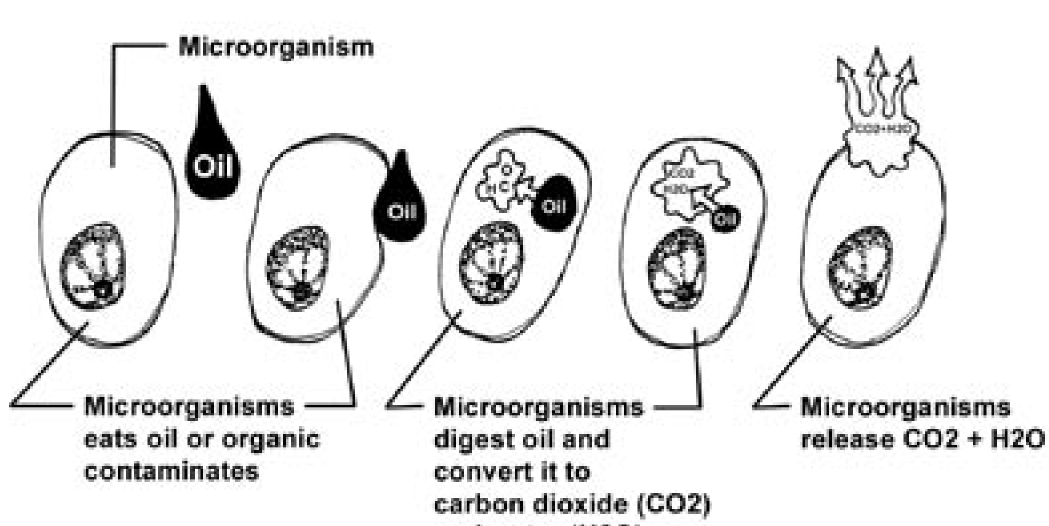
Significant portions of the westside of Long Beach, especially along the west bank of the river, are devoted to industrial uses that create potential environmentally hazardous situations. The design team did not have access to data regarding actual contaminants or the extent of the pollution for the entire westside of Long Beach. A detailed report on the former Oil Operators, Inc. property (Wrigley Heights Park) was prepared in 1998 by QST Environmental, Inc., which describes the extent of the contamination plume for this site and outlines a remediation process. The design team assumes from the information available that because of current or former uses, other potential park sites in the westside of Long Beach can be expected to have varying levels of contamination. This would include the Southern Pacific Railroad right-of-ways adjacent to the existing Drake Park, the MTA property south of Drake Park, the Mini-Transit property west of Edison Elementary School, the city storage lots located north of Anaheim Street between Magnolia Avenue and the river channel, as well as various other sites across the westside of Long Beach that were once home to uses such as gas stations. Detailed environmental studies will have to be conducted to accurately determine the levels of contamination and the most appropriate remediation processes for these sites. Due to the City's policy requiring a 'No Further Action' letter before they can purchase contaminated property, the design team recommends research into the use of bioremediation and phytoremediation processes to assist current property owners in the clean-up of the sites. This practice could lead to open space opportunities such as 'Ephemeral Open Spaces,' as described in the *Future Opportunities Section.*

Bioremediation

Bioremediation is a treatment process that uses naturally occurring organisms (yeast, fungi, or bacteria) to break down, or degrade, hazardous substances into less toxic or non-toxic substances. Certain microorganisms can digest organic substances such as fuels or solvents that are hazardous to humans. The microorganisms break down the organic contaminants into harmless products – mainly carbon dioxide and water. Once the contaminants are degraded the microorganism population is reduced because they have used all of their food source. (USEPA, 1996)

Phytoremediation

Phytoremediation is the use of plants and plant metabolic functions to clean and stabilize contaminated soil sediments or groundwater. Plant



The Bioremediation Process (Adapted from USEPA, 1996) metabolisms can support the process of remediation and restoration in many ways:

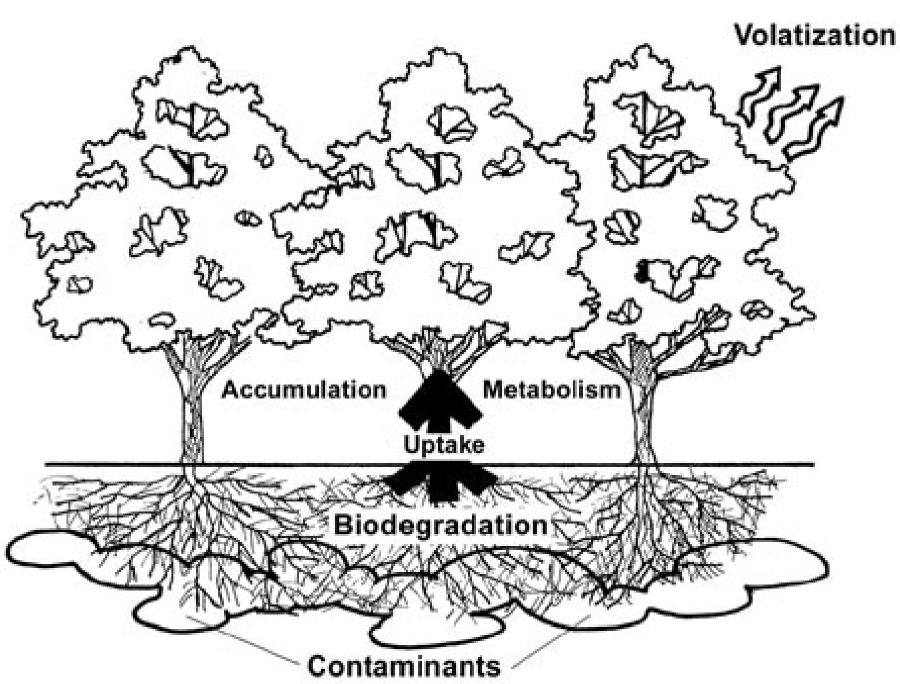
Phytoextraction - removal and concentration of contaminants, generally metals, in plant tissues

Phytostabilization – erosion control of contaminated soils or hydraulic control through management of soil water balance

Phytotransformation – plant uptake and transformation of contaminants to less toxic forms

Rhizofiltration – the removal of contaminants by absorption to plant roots

Rhizosphere bioremediation – enhanced microbial degradation of contaminants near plant root surfaces (USEPA, 1996)



The Phytoremediation Process
(Adapted from Black, 1999)

Westside of Long Beach Perceptions

Imageability

In order to understand the wayfinding and orientation problems of the westside of Long Beach, the design team studied how residents and visitors relate to their surroundings. As visitors to the westside of Long Beach, the design team experienced and recorded the disorientation of traveling towards destinations in an unfamiliar city. The design team also noted recognizable features in the urban landscape that seemed to reflect all of Long Beach. A large portion of the visioning questionnaire was developed to gain insight from residents into their personal images and perceptions of Long Beach, the westside of Long Beach, and the Los Angeles River. Much of this was based on the survey format outlined by Kevin Lynch in his 1960 book, *The Image of the City*. Lynch used the questionnaire to help understand the imageability of the city. Imageability is that quality in a physical object, such as a park or building, which gives it a high probability of evoking a strong image in any given observer. (Lynch, 1960)

The image of the city is a recognizable pattern of related parts that come together to reinforce a given value. Outreach meeting participants were asked to denote daily travel routes, significant points of interest in the westside of Long Beach, neighborhood boundaries, and recognizable features, as well as give cognitive directions around the westside of Long Beach. Nearly all the questionnaire respondents (90%), recognized downtown Long Beach as a distinct part of the city, and 23% recognized the Bixby Knolls Shopping Center, as well as the Wardlow Blue Line Station, as smaller, but definable centers within the westside of Long Beach. The bridges crossing the Los Angeles River were called out by 25% of the respondents as noticeable landmarks in the city. These findings informed the design team on physical features recognized by people living in the city. The following map shows the overlay of the paths, edges, nodes, districts, and landmarks that the residents identified as well as those that the design team inventoried during visits to Long Beach.

Paths

Paths are the linear elements upon which people move through the city and observe it. They are roads, walkways, bikeways, transit lines, and so forth, and are the predominant element in the image of the city (Lynch, 1960).

Analysis: In the westside of Long Beach, there are many recognizable paths in the older sections of the city near downtown Long Beach. However, north of Del Amo Street, there are very few major or minor paths which the community called out as significant. The major arterials were recognized, but only one collector street was identified. This demonstrates that north Long Beach is a very auto-centric area, promoting individual car use on major streets rather than pedestrian or bicycle travel along minor roads.

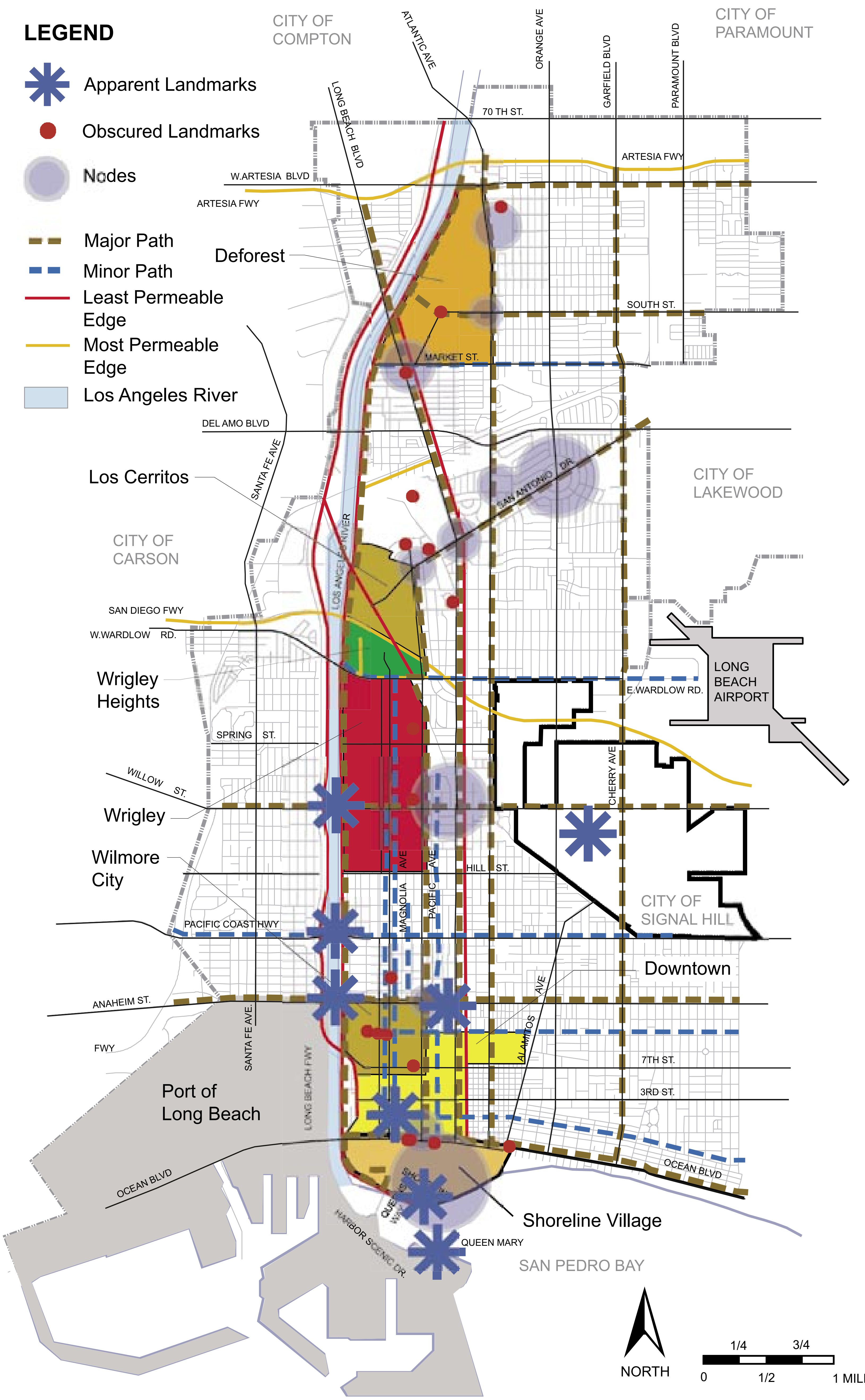
Design Opportunity: Because of the lack of well defined paths in north Long Beach, the design team will enhance the existing infrastructure of those identified paths as well as designate and enhance other needed paths. South of Del Amo Boulevard the network of paths is well defined; however other streets may be designated as paths to complete the network. This network can promote pedestrian and bicycle travel, as well as accommodate automobile traffic, to lead people to the Los Angeles River greenway.

Edges

Edges are the linear elements of the city that are not typically used as paths by the people. They are boundaries or barriers, which can have a varying degree of permeability, physically distinguishing one section of the city from another (Lynch, 1960).

WESTSIDE OF LONG BEACH

PRECEPTIONS OF THE CITY



Analysis: There are very few recognizable edges in the westside of Long Beach. Edges of natural features such as topological ridges and valleys are lost due to the urban fabric. The most culturally dominant edge is the berm along the Los Angeles River. The Metro Blue Line bridge, Long Beach Boulevard, and Del Amo Boulevard are other significant edges. Del Amo Boulevard was noted as being the southern boundary of North Long Beach. Some are more permeable than others; generally people can cross edges fairly easily. The lack of edges suggests that the neighborhood or district borders are not easily identifiable.

Design Opportunity: The enhancement of both natural and cultural edges will better define the neighborhoods of the westside of Long Beach. Currently, neighborhoods and urban features extend over natural edges, however if people are made aware of the significance of these edges then future urban design features will begin to relate to them. The berm along the river channel will exist for many years to come as a defining boundary between the river and parks and the neighborhoods. However, the berm can be made more permeable, or accessible, to the public by increasing access points and activity nodes along it.

Districts

Districts are sections of the city, which are recognized as having a common identifiable character. The visitor is mentally aware of being inside the district (Lynch, 1960).

Analysis: Districts or neighborhoods along the river were inventoried to define thematic elements that would inform the design of park and street amenities. Two prominent gaps exist in the community responses: south of Wrigley to Willmore City and from Los Cerritos north to Deforest. These two areas were not recognized by the community as having a unifying element or recognizable edges that would distinguish them from other districts.

Design Opportunity: Amenity design guidelines are needed for each district or neighborhood adjacent to the Los Angeles River. Thematic design principles can be extracted from the ecological and cultural character of the two identified areas not defined by the community, to create a cohesive experience along the river greenway.

Nodes

Nodes are defined as the concentrated centers where the visitor travels to and from. They are smaller in scale than districts, yet still possess the quality of being inside of a space. Nodes can be characterized as intersections and junctions of paths, or small concentrations of activities (Lynch, 1960).

Analysis: In the westside of Long Beach, nodes occur mostly at major street intersections and at shopping areas; existing parks were rarely called out as nodes, showing that open space in the westside of Long Beach is not integrated into people's daily lives. The community did not identify any nodes along the Los Angeles River. This shows that there is activity happening at key points in the city, particularly at street intersections, but that nothing special occurs along the river. Furthermore, any activity along a street occurs at one or two locations only, creating disparate pockets of activity.

Design Opportunity: Along the Los Angeles River, nodes need to be created with varying levels of activity. It is anticipated that these nodes can create a pulse of activity along the river and paths or roads leading into the greenway, allowing people different levels of interaction. Each district adjacent to the river greenway will have at least one node to serve as its river access point. By creating different nodes along the paths and greenways, an activity network will develop in conjunction with the path network, creating points of interest where paths cross.

Landmarks

Landmarks are a type of point-reference, which the visitor can see from a distance and can relate to a particular point in the city. These are not areas into which people can enter, unlike nodes. They are single elements that can be discerned from the surrounding features (Lynch, 1960).

Analysis: The design team and community members identified two different types of landmarks: apparent and obscured. Apparent landmarks can be seen from a distance, most notably from the Los Angeles River. The World Trade Center in downtown Long Beach and the oil derricks on Signal Hill are apparent landmarks. Obscured landmarks are culturally significant to their respective neighborhoods but cannot be seen from a distance. Examples of obscured landmarks are historic homes and buildings. The map shows that apparent westside of Long Beach landmarks exist only south of Willow Street This alludes to the general feeling of disorientation that visitors feel when traveling along the North Long Beach stretch of the river channel because they cannot tell where along the river they are.

Design Opportunity: Opportunities exist to create apparent landmarks along the river in North Long Beach. These landmarks will be a visual clue to visitors, alluding to where they are on the river. By creating a series of landmarks, visitors can travel towards one landmark, catch sight of the next landmark, and then move towards that point. This will create a network of visual cues that will reassure the visitor that they are headed in the chosen direction.

The understanding and enhancement of the image of Long Beach will create a legible urban fabric that speaks to the physical and cultural sense of place. It will assist in urban wayfinding, which is discussed below, helping people to overcome disorientation and navigate towards the Los Angeles River and the public spaces that line its banks.

Wayfinding

The examination of the imageability of Long Beach led the design team to investigate wayfinding conventions and to propose a wayfinding system that would assist in directing people from the neighborhoods to the Los Angeles River. “When people feel oriented and confident that they can find their way around, their eagerness to explore an area is increased and their general anxieties are lessened” (Kaplan et al, 1998, p. 49).

A clear, distinguishable, informative signage system is integral to the success of any urban wayfinding system. When integrated with legible city elements, signage and directional maps aid visitors in locating points of interest, and using them to navigate towards destinations.

Analysis: The design team observed that currently there is no direct wayfinding system in Long Beach to lead residents and visitors to the Los Angeles River greenway. Based on the Los Angeles River Master Plan, the County of Los Angeles Department of Public Works has developed signage guidelines dictating the conventions to be used along the entire 51-mile course of the river as well as its tributaries. The signs will serve to identify the river and its tributaries, identify access points, and direct visitors to recreational parks and amenities along the river’s edge. The signs will not, however, direct users from the river to adjacent neighborhoods (Los Angeles County Dept. of Public Works, 2003).

Design Opportunity: The design team proposes a landscape architectural response to wayfinding. Through dramatic signage and landscape architectural elements, such as plantings and pavement changes, a wayfinding system can be created that leads the visitor from various points in the westside of Long Beach to the Los Angeles River greenway, connects river users to local parks, through design and material selection, creating a thematic link to the ecological and cultural heritage of the adjacent neighborhoods. This wayfinding system follows a hierarchy known as the “peeling the onion approach,” which creates layers of signs directing people from outlying points to destinations without using an excessive amount of signs (Berger, 2002).

An effective wayfinding system can enhance orientation in and around the westside of Long Beach. It is anticipated that improved signage and landscape architectural treatments such as planting and pavement changes easily direct residents and visitors towards the Los Angeles River greenway.

Built Environment

The objective of thematic design is to develop visual style and architectural guidelines for the built environment or the amenities and structures of the RiverLink parkway system. The built environment of RiverLink, if properly executed, will influence the visitor experience, create a better connection to place, enhance the identity of the City of Long Beach as a high-quality provider of outdoor recreation, and give favorable impressions on how the City of Long Beach is protecting and enhancing the environment.

The built environment of the Long Beach RiverLink must have the look and feel of the neighborhoods and the natural environment of the Los Angeles River's urban character and landscape. These guidelines will create an overarching architectural theme, as well as a sense of place for the RiverLink system and surrounding neighborhood parks.

Cultural Context

The cultural context is based on the greenway system's relation to Long Beach's history and culture. Factors such as the development of the flood control channel in the 1930s, the vernacular architectural styles of the neighborhoods of Long Beach, as well as the population diversity, make up Long Beach's cultural mosaic. This information is given in the section of this document entitled Cultural Settings.

Key factors of the cultural context include:

- Highly urban setting
- Four main cultural groups Anglo, Asian, Black, and Hispanic
- People attracted to water and cooler places for recreational needs
- Strong influence of contemporary Hispanic culture: need to accommodate larger group gatherings and facilities
- Multicultural society
- Active oil drilling, active container and cruise ship port—former naval and aviation influences
- Projected to experience a 9.4% increase in population between 2000 and 2010

Ecological Context

The ecological context is based on the climate, historic vegetation occurrence and geologic features of Long Beach and Southern California. This information is given in Ecological Setting.

Key factors of the ecological context include:

- Coastal fog and marine climate influences
- Hot and dry summers
- Dominance of urban form over vegetation
- Solar exposure and late afternoon sun
- Disturbances of soil and vegetation slow to heal
- Historical occurrence of coastal sage scrub plant communities
- Historically sparser grassland vegetation upland and oak woodlands
- Ornamental palm tree plantings in boulevards

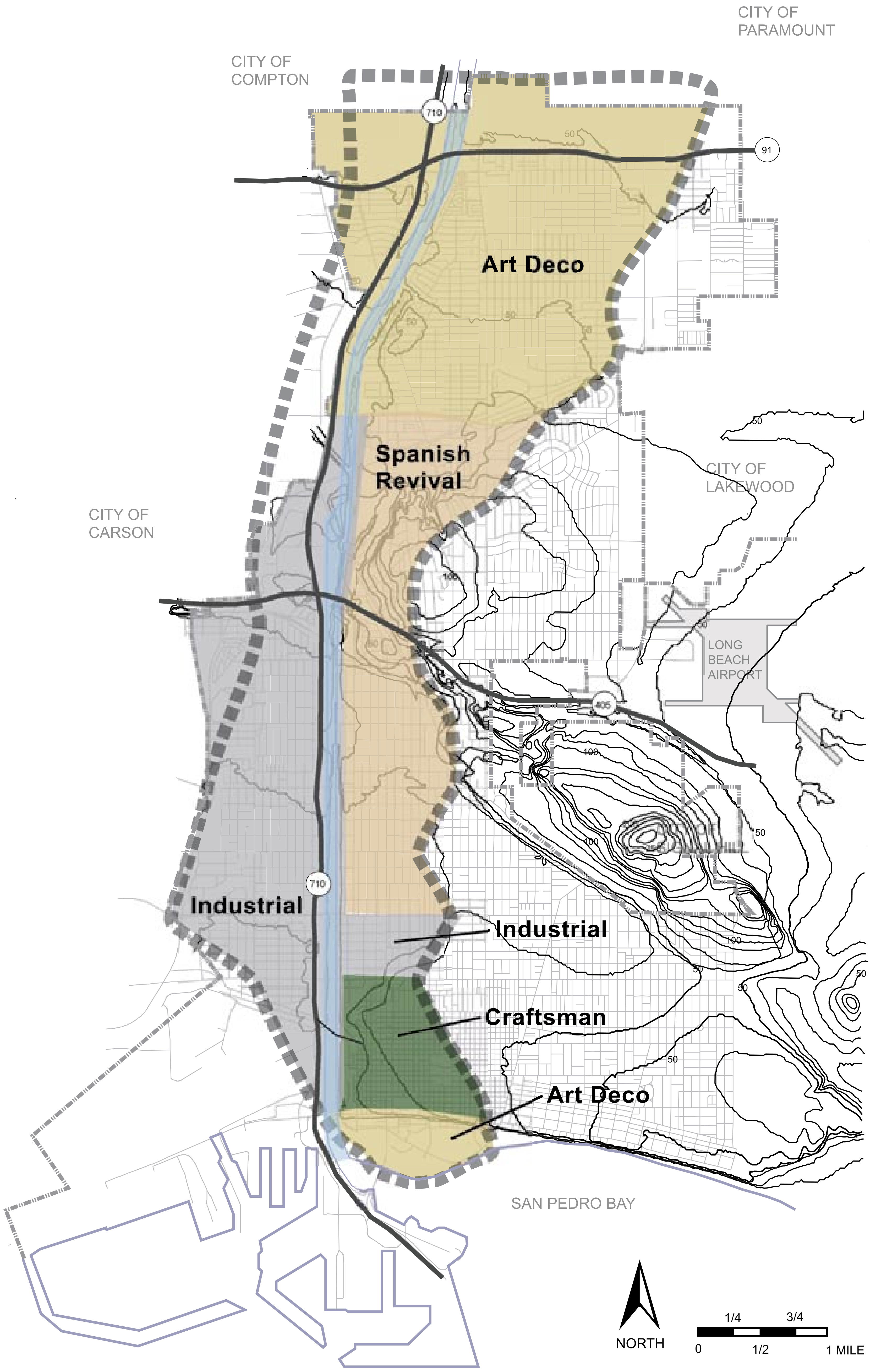
Major architectural themes established for the RiverLink destination parks and overall system amenities are based on case study research, historical sources and data, City of Long Beach redevelopment efforts, community meetings input, and building and structure surveys conducted by the design team.

- Large-scale elements, structures and architectural styles for the Los Angeles River's bridges, pump stations, port administrative buildings, and downtown buildings demonstrate the Art Deco and Works Progress Administration (WPA) Modern (1925-1940) styles. This is primarily due to two major factors: first, the creation of the Los Angeles River channel, and second, the earthquake of 1933. In the 1933 earthquake, many deaths were attributed to the falling pieces of ornamentation from the downtown renaissance revival buildings and other ornate structures of the preceding 1920s styles and hence, in response, reconstruction was in the Art Deco style.
- Industrial buildings, power lines, port infrastructure, rail trestles and tracks, and oil drilling, pumping, refining, and piping all pervade the perimeter of the Los Angeles River channel in Long Beach, especially south of the Pacific Coast Highway.
- Residential and smaller scale commercial buildings were constructed in three main styles significant to the RiverLink neighborhood project areas and are ubiquitous to Southern California, such as Craftsman and Bungalow (1900-30), Spanish and Monterey Revival (1915-1955) and Deco and Moderne (1925-1949).

WESTSIDE OF LONG BEACH

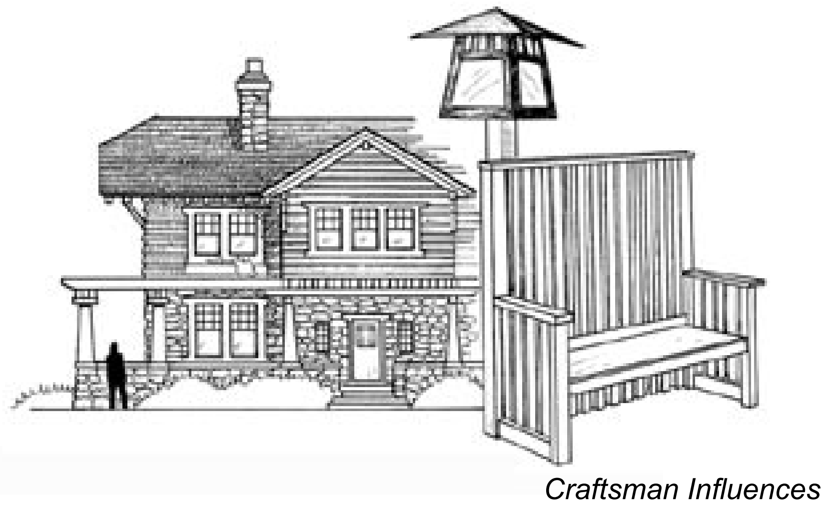
CHARACTERISTICS OF THE BUILT ENVIRONMENT

SOURCE: BASE MATERIALS PROVIDED BY CITY OF LONG BEACH, CA



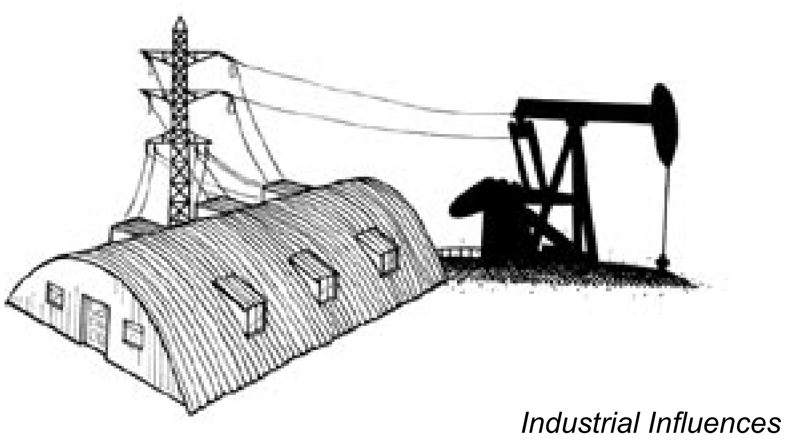
Art Deco Influences
(Adapted from Baker, 1994)

Style elements: Ornate geometric details, motifs and swags, set-back rooflines, and symmetrical facades
Colors: Masonry and stonework grays and browns with metallic highlights
Scales: Monumental to residential



Craftsman Influences
(Adapted from Baker, 1994)

Style elements: Rustic textures, exposed rafters, broad overhangs and random course masonry
Colors: Rich dark browns and wood stains, dark and olive greens and light grays
Scales: Residential large multi-story to intimate (Bungalow)



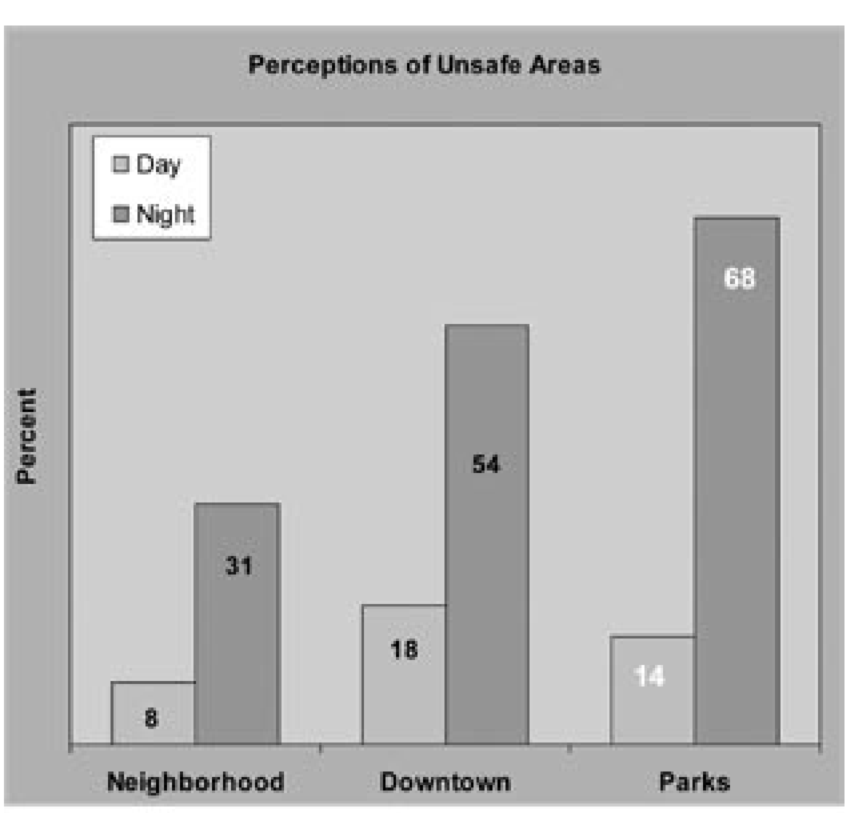
Industrial Influences

Style elements: Metals such as corrugated steel and brushed aluminum, open web trusses and joists
Colors: Warm and cool grays, rust
Scales: Monumental to small utility structures

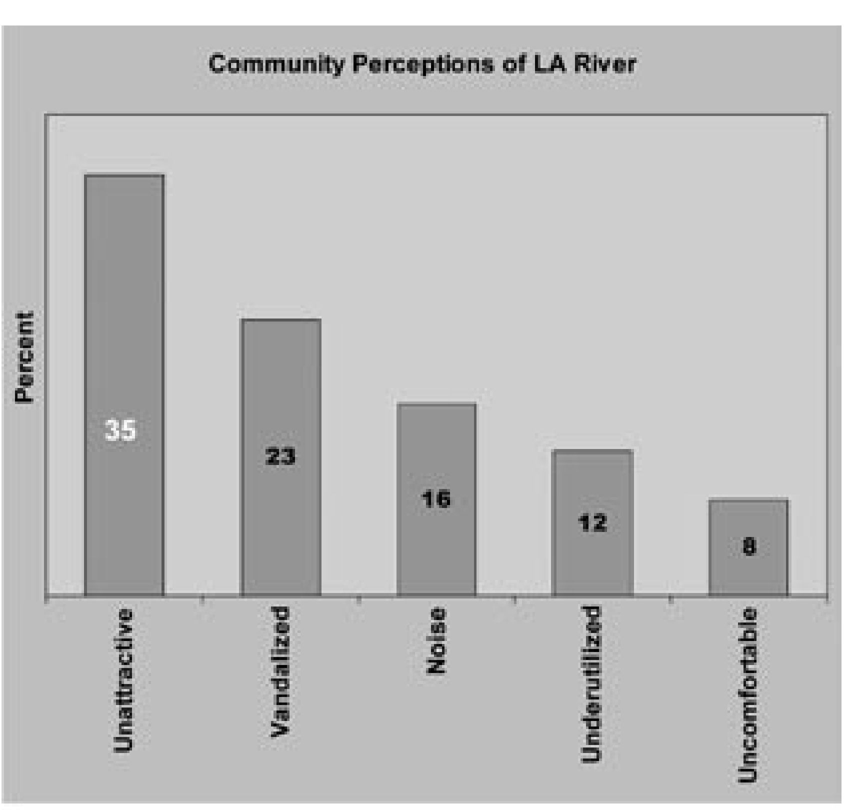
Spanish Revival Influences
(Adapted from Baker, 1994)

Style elements: Tile roofs and accents, stucco walls and surfaces, ornamental ironwork and pronounced entryways
Colors: Terra cotta, pinks, creams and light tans
Scales: Multi-story commercial buildings, churches and hospitals, to small residential

Generally, the structures of Long Beach are striking, in massing and simplicity of forms, however there is a strong tradition of ornament based on the architectural style. This manifests itself in details such as rooflines, overhangs, and cornices, as well as entries, windows, and building hardware. The rancho era's tradition of courtyards, porches, and overhangs is a clear response to climate. The area's climate, with its strong western sunlight and coastal breezes can be harvested for energy, cooling, and heating. "Care must be taken to incorporate the elements of the" vernacular architecture of Long Beach "without resorting to clichés or quasi-historical replicas" (USDA, 2001, p. 228).

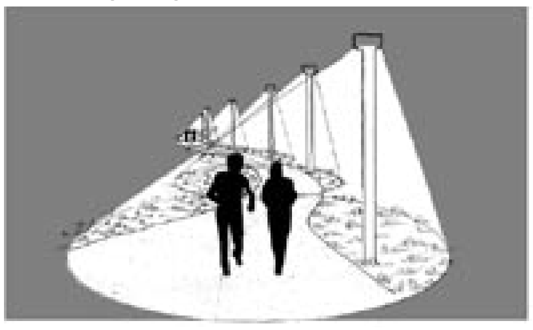


(Source: City of Long Beach, 2002c)



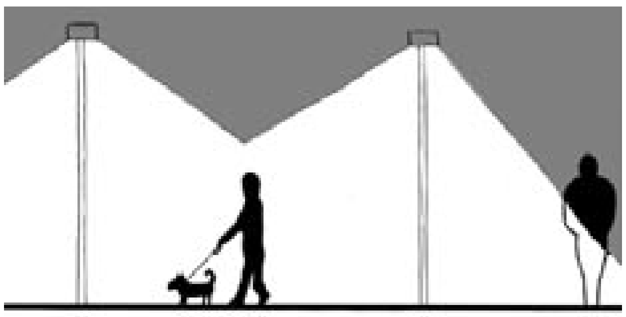
(Source: RiverLink community meetings results, 2003)

Clear Lighting Patterns



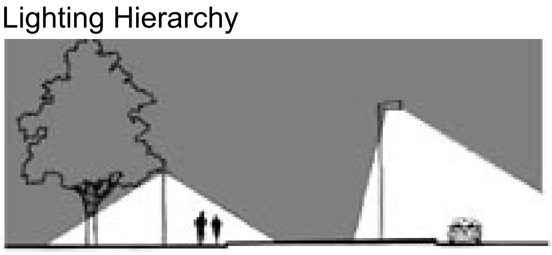
Clear optical guidance can be provided with the positive alignment of light fixtures positioned in consistent, recognizable patterns.

Vertical Lighting



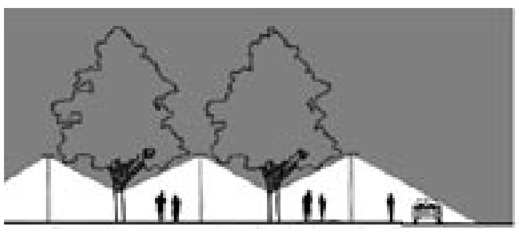
Vertical lights over walkways areas should cover or overlap so that visual recognition of the pedestrians is maintained.

Lighting Hierarchy



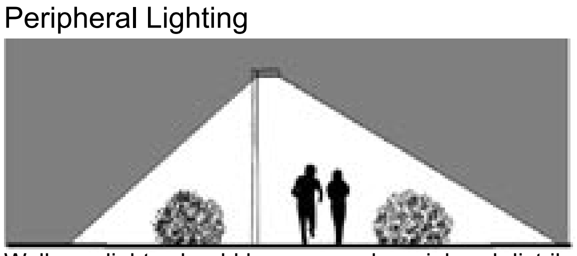
Vehicle and pedestrian orientation is aided by providing a hierarchy of lighting that corresponds to the different zones and uses of the site.

Placement of Luminaries

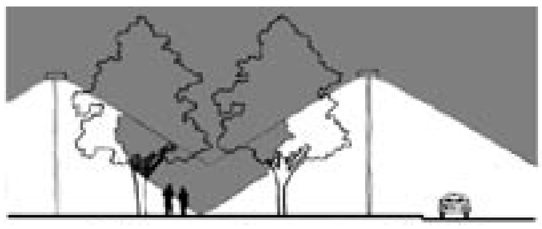


Low mount fixtures can provide for better distribution. Pedestrian's sense of security is promoted by the uniformity of the lighting.

Peripheral Lighting



Walkway lights should have enough peripheral distribution to illuminate the immediate surroundings.



High mount fixtures may conflict with trees creating an undesirable shadow.

(Adapted from Harris and Dines, 1998)

Safety Considerations

Safety concerns became key issues raised at the community outreach meetings. The issue that received the widest response was safety in parks; 24% noted problems with crime, vagrancy, and drugs, mostly at night, and 15% asked for increased security patrols. These concerns were additionally confirmed by investigating the responses by The National Citizen Survey Report of Results for Long Beach, CA. July 2001, in which 68% percent of the residents of Long Beach considered their parks more unsafe at night than either downtown or their own neighborhoods (City of Long Beach, 2002c).

Crime, vandalism, delinquency, and the factors that drive these behaviors, such as poverty, substance abuse, and population demographics and density, are in many ways beyond the scope and control of landscape architecture. However, there are some factors that can be mitigated by landscape design and programming. The following are actions and techniques the design team suggests to address safety concerns.

Animation and Activity

Analysis: Having large groups gathered in a space and increasing park use has been shown to deter crime (Harnik, 2003). User presence can be stimulated by aggressive maintenance and opportunities for programmed user activities.

Design Opportunity: Resident involvement in the inspection, repair, and cleanup of park facilities is a key to safety. Engaging youth and teenagers in park recreation programs and facilities can decrease incidents of facility abuse and vandalism (Harnik, 2003).

Lighting and Sight Lines

Analysis: As noted in the community outreach results (see Appendix A), Long Beach residents noted safety concerns about using their parks at night. Every provision should be made for adequate lighting placement and clear sight lines in the RiverLink system.

Design Opportunity: Proper lighting will illuminate potentially dangerous areas, and landscape plantings must allow for clear sight lines from pathways to amenities and gathering spaces. This will allow security vehicles and other patrols to have unrestricted views from the street to the berm.

Security Personnel and Patrols

Analysis: Westside parks lack regular security patrols. The LARIO bike path does not have a regular patrol group, adding to the unsafe feeling many residents have towards the Los Angeles River.

Design Opportunity: Based on discussions with residents, community members should be considered for enlistment in walking or bicycle patrols for neighborhood parks within the RiverLink system, similar to neighborhood watch programs. This must be a consideration for supplementing existing Long Beach park rangers and police. A uniformed presence of park employees decreases anxiety among park users (Harnik, 2003). Uniforms for volunteers serving as park docents or guides must also be considered to aid in this presence.

This information has provided the design team with the theoretical background and appropriate design opportunities and strategies to propose solutions for connecting the neighborhoods of the westside of Long Beach to the Los Angeles River greenway. Furthermore, these strategies can be used in other instances where connections between city and significant natural features are desired.

Summary of Opportunities

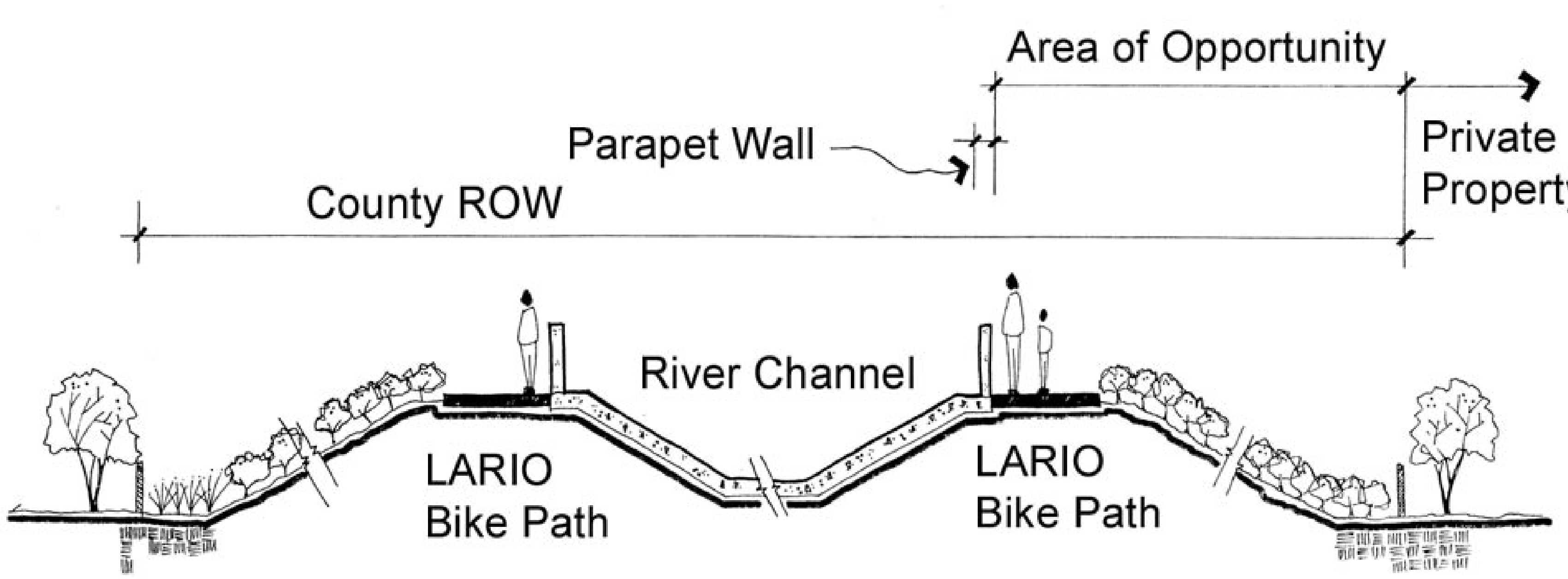
In the preceding sections, the design team has outlined significant opportunities in order to guide the design process. To reconnect neighborhoods of the westside of Long Beach with the Los Angeles River, as well as its natural and cultural heritage, the RiverLink system shall be integrated into the current mass transit infrastructure. This path system should be enhanced and augmented with Class II and Class III bike routes, shared roadways, and bicycle boulevards. In addition, opportunities exist to enhance pedestrian connections to the river through careful streetscape design, and automobile-oriented roads should be designated, allowing vehicular access to the river greenway.

Opportunities also exist to enhance wayfinding throughout the westside of Long Beach, using landscape architectural responses such as special plantings and pavement designs. It is anticipated that the enhancement of natural and cultural edges will help to better define neighborhoods by extracting the ecological and cultural qualities that define them. These qualities shall be used to link the heritage of the neighborhoods to the design of their parks. Additionally, landmarks will be placed along the river to visually guide people from parks to other spaces within the system.

In order to increase the amount of safe and accessible open space in the westside of Long Beach, connections and destinations will be created along the Los Angeles River to provide large open spaces, park amenities, and recreation. Increased lighting and unobstructed sight lines will assist in making the parks safe for residents. Community involvement in the management of the parks, as well as volunteer patrols, will create community ownership of the parks and will also increase public safety.

The design team anticipates that the restoration and enhancement of appropriate habitats will improve the natural qualities of the park sites and strengthen the connection between people and nature. Urban forestry assists in habitat creation and along with bio- and phytoremediation techniques, will help to reduce pollution in the westside of Long Beach and alleviate potentially hazardous conditions on particular sites.

The purpose of this document is to envision possibilities for an integrated open space and recreation network in the westside of Long Beach. The methods and research, described previously in this document, provide opportunities for creative and appropriate design strategies applied to the urban fabric of the westside of Long Beach. Furthermore, the research provides the theoretical background to justify the decisions made in the design process. The next section showcases the design concepts for reconnecting the westside of Long Beach to the Los Angeles River, and the specific strategies to make the concept function appropriately. ■



RiverLink Area of Parks and Open Space Opportunities